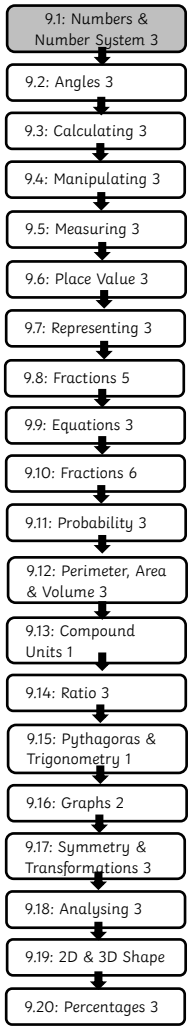
Personalised Learning Checklist (PLC): Year 9 Core



Unit 1 – Numbers and the Number System	Sparx Codes
Find multiples and lowest common multiples of numbers	M227
Know whether a number divides by 2, 3, 4, 5, 9 or 10 Find factors and highest common factors of numbers	M823 M698
Recognise the prime numbers 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, …	M322
Find the prime factors of a number using a calculator or factor tree	M108
Use Venn diagrams with prime factors to calculate HCF and LCM	M365
Recognise and use square numbers 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, …	M135
Recognise and use cube numbers 1, 8, 27, 64, 125, …	M135
Read, write and evaluate powers & recognise powers of 2, 3, 4 and 5	M135
Find square roots, cube roots and other roots (using √ symbols)	M135
Use a scientific calculator to find powers and roots	M135
Know that a number to the power zero is 1	M135
Convert a root to a rough decimal value	
Convert numbers between standard form and ordinary form	M719 M678
Enter numbers in standard form on a calculator	

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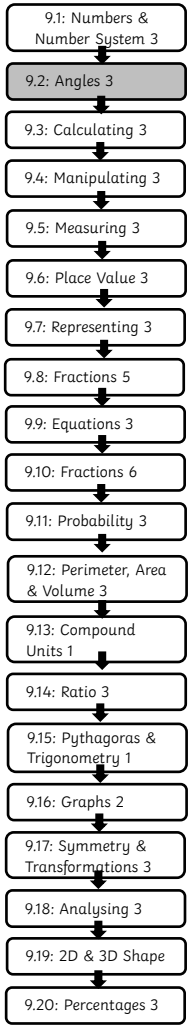

Unit 2 – Angles 3	Sparx Codes
Recognise and use angle rule: vertically opposite angles are equal	M163
Recognise and use angle rule: angles around a point add to 360°	M818
Recognise and use angle rule: angles at a point on a line add to 180°	M818
Recognise pairs of alternate or corresponding angles	M606
Work out missing angles in diagrams involving parallel lines	M606
Know that the angles in a triangle add to 180 degrees	M351
Know and use angles in isosceles, equilateral and scalene triangles	M351
Understand the proof of the angle sum of a triangle	M351
Know that the angles in a quadrilateral add to 360 degrees	M679
Know and use angles in special quadrilaterals	M679
Work out the angle sum for any polygon using triangles	M653
Work out interior and exterior angles in regular polygons	M653

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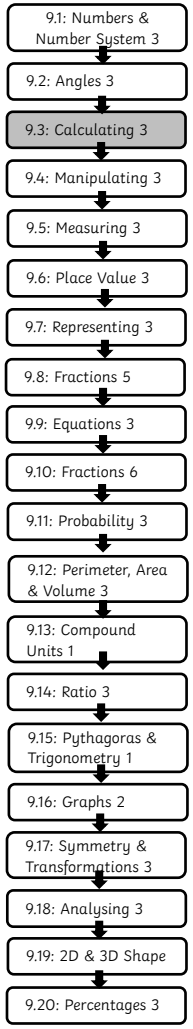

Unit 3 – Calculating 3	Sparx Codes
Add decimals	M429
Subtract decimals	M152
Multiply integers and decimals by a decimal	M803
Divide a decimal by any integer	M262
Divide integers and decimals by a decimal	M491
Add and subtract with negative numbers	M106
Multiply and divide with negative numbers	M288
BIDMAS	M521

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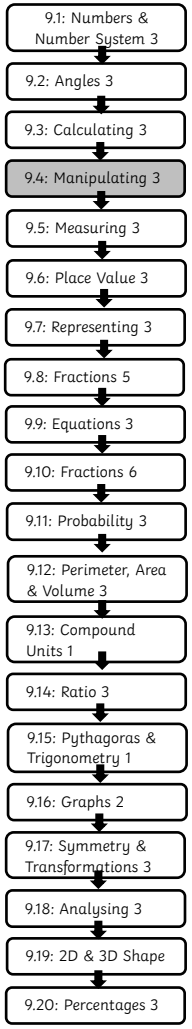

Unit 4 – Manipulating 3	Sparx Codes
Know the terms expression, equation, inequality, term, formulae, function Know and use basic algebra notation	M813 M830
Write expressions from words	
Simplify complex expressions by collecting like terms	M795 M531 M949
Simplify expressions using rules of indices for multiply and divide	M120
Expand a single bracket	M237
Simplify an expression involving expanding a single bracket	M792
Expand and simplify two brackets	M960
Factorise with a single bracket	M100
Substitute into expressions and formulae	M417 M327 M208 M979
Rearrange formulae	M184

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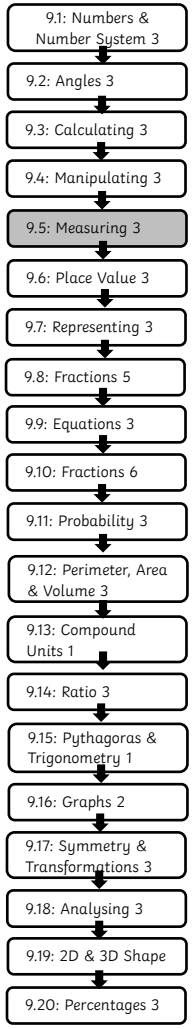

Unit 5 – Measuring 3	Sparx Codes
Understand labelling notation for lengths and angles	M331 M985
Use ruler and protractor to construct triangles	M565
Use ruler and compasses to construct triangles when 3 sides known	M565
Know congruent shapes have equal sides and equal angles	M124
Use the congruence criteria for triangles (SSS, SAS, ASA, RHS)	M124
Construct an angle bisector	M232
Construct a perpendicular bisector of a line segment	M239
Construct a perpendicular to a line or from a point	M239
Know the perpendicular distance is the shortest distance	
Be familiar with locus/loci	M253
Understand, use and interpret scale factors and scale diagrams	M112

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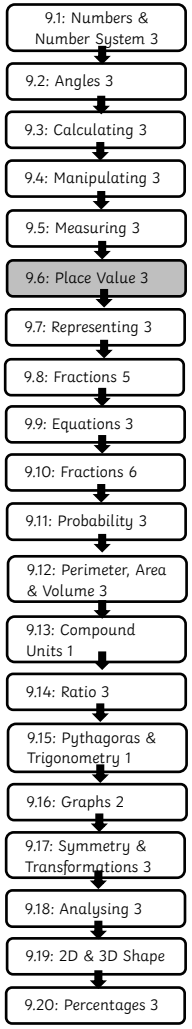

Unit 6 – Place Value 3	Sparx Codes
Use the signs <, ≤, >, ≥, =, ≠ to compare numbers Use a compound inequality to compare numbers (e.g. -1<0.5<4) < (less than) ≤ (less than or equal to) > greater than ≥ greater than or equal to = equal to ≠ not equal to	
Read and write numbers, and identify values of given digits	M704 M522
Order a set of integers and decimals	M553
Round a number to a specified number of decimal places	M431
Round a number to a specified number of significant figures	M994 M131
Estimate calculations by rounding to one significant figure	M878
Estimate and check if solutions to problems are the correct size	M878
Decide is an estimate is an overestimate or underestimate	M878
Understand error interval notation a ≤ x < b and express rounding errors using a ≤ x < b	M730
Understand the concept of upper and lower bounds	M730

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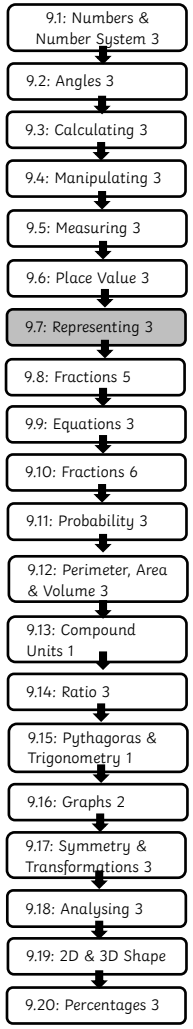

Unit 7 – Representing 3	Sparx Codes
Know that discrete data is data which can be listed or counted, and continuous data is measured data	U322 (GCSE)
Know that primary data is data you have collected yourself and secondary data has been collected by someone else	U322 (GCSE)
Know that qualitative data is descriptive and quantitative data is numerical	U322 (GCSE)
Construct and interpret frequency tables	M899 M441
Construct and interpret bar charts Construct and interpret comparative bar charts	M460 M738
Compare data using appropriate representations	U520 (GCSE)
Construct and interpret pie charts	M574 M165
Plot bivariate data on a scatter graph Understand positive and negative correlation Draw and use a line of best fit on a scatter graph	M769 M596
Know interpolation is estimating within data values on a graph and this is generally reliable	
Know extrapolation is estimating outside data values on a graph and this is unreliable	
Plot a cumulative frequency graph	U182 (GCSE)

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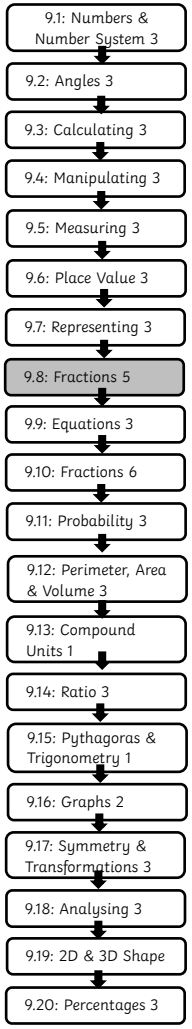

Unit 8 – Fractions 5	Sparx Codes
Shade or interpret fraction diagrams Construct fractions	M158 M939
Convert between improper and mixed numbers	M601
Equivalent fractions	M410
Simplify fractions	M671
Order fractions using common denominators or by writing as decimals	M335
Find a number between two fractions or integers	
Know fractions represent division & decide if a fraction is terminating or recurring	
Convert between fractions and decimals with or without a calculator	M958
Convert fractions to recurring decimals	M922
Convert recurring decimals to fractions on a calculator and use recurring decimal notation	M701
Find a fraction of an amount with or without a calculator	M695 M684
Find the original amount from a fraction	
Write one quantity as a fraction of another	

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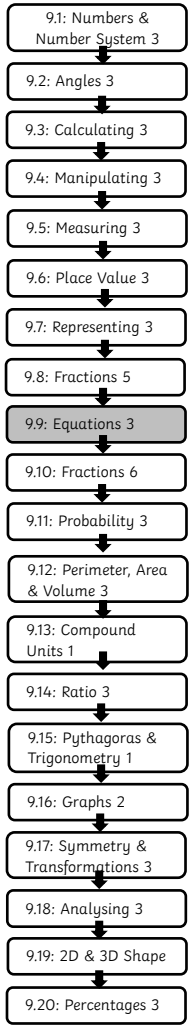

Unit 9 – Equations 3	Sparx Codes
Solve equations with one step, or two or more steps	M707 M509
Solve equations when the solution is a positive or negative integer, or fraction	
Solve equations involving brackets	
Solve equations where the unknown is the numerator of a fraction	
Solve equations where the unknown appears on both sides	M554
Use expressions, equations or formulae to represent and solve problems	M813 M957
Solve inequalities	M118 M732
Represent a solution on a number line	M384

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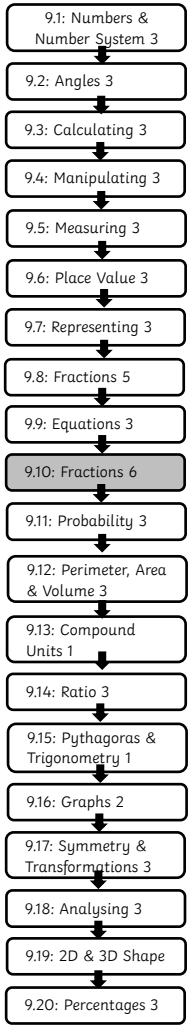

Unit 10 – Fractions 6	Sparx Codes
Add and subtract fractions with different denominators	M835
Add and subtract mixed fractions	M931
Multiply an integer by a fraction Multiply two fractions together	M157
Multiply by a mixed fraction	M197
Divide an integer by a fraction Divide a fraction by an integer Divide a fraction by a fraction	M110
Divide with mixed fractions	M265
Use a calculator to complete fraction or mixed fraction calculations	
Solve fraction problems in the context of shape/geometry	

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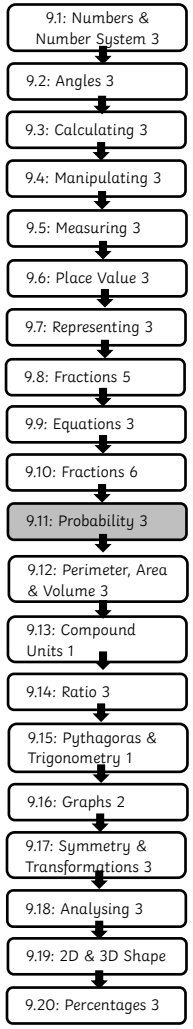

Unit 11 – Probability 3	Sparx Codes
Understand probability phrases	M655
Understand the 0 – 1 probability scale Understand randomness, fairness and bias Understand equally or unequally likely events	
Calculate probability and write it as a fraction, decimal or percentage	M941 M938
Sample space diagrams	M718
Know mutually exclusive events can't happen at the same time, and the sum of their probabilities is 1 Probability of mutually exclusive events	M755
Expected results from repeated experiments	M206
Calculating experimental probabilities	M332
Use a table or frequency tree to list outcomes	
Represent outcomes using a Venn diagram	M829
Probability from Venn diagrams	M419
Venn diagrams set notation: recognise the symbols { } for sets, ∩ for intersection and ∪ for union	M834

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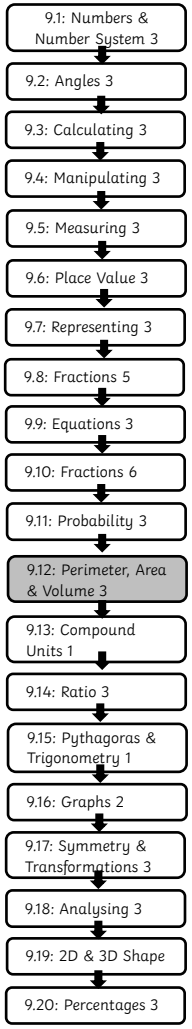

Unit 12 – Perimeter, Area & Volume 3	Sparx Codes
Find the perimeter of a shape or composite shape	M920 M635 M690
Area of a rectangle (Area = length x width)	M390
Area of a triangle (Area = $\frac{1}{2}$ x base x height)	M610
Area of a parallelogram (Area = base x height)	M291
Area of a trapezium (Area = $\frac{1}{2}$(a + b) x height)	M705
Circumference of a circle (C = π x diameter)	M169
Area of a circle (Area = πr^2)	M231
Arc length or perimeter of sectors	M280
Area of sectors	M430
Area of compound shapes involving triangles and rectangles (or parts of circles)	M269 M996
Calculate exactly with multiples of π	
Volume of a cuboid (V = length x width x height)	M765
Find the surface area of a cuboid	M884 M534
Volume of a prism (V = area of cross-section x height), including cylinders (V = πr^2 x height)	M722 M697
Calculate the surface area of a prism	M661 M697

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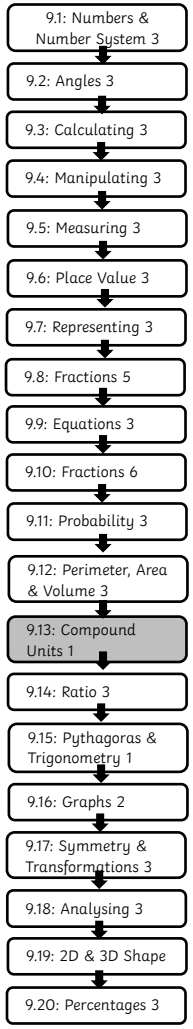

Unit 13 – Compound Units 1	Sparx Codes
Calculate speed, distance or time (Speed = Distance ÷ Time)	(GCSE) U151
Know and use the correct units for speed (eg mph, km/h, m/s)	(GCSE) U151
Calculate density, mass or volume (Density = Mass ÷ Volume)	(GCSE) U910
Know and use the correct units for density (eg g/cm^3, kg/m^3)	(GCSE) U910
Calculate pressure, force or area (Pressure = Force ÷ Area)	(GCSE) U527
Know and use the correct units for pressure (eg N/m^2)	(GCSE) U527
Understand and calculate population density	
Solve problems involving compound units	(GCSE) U842

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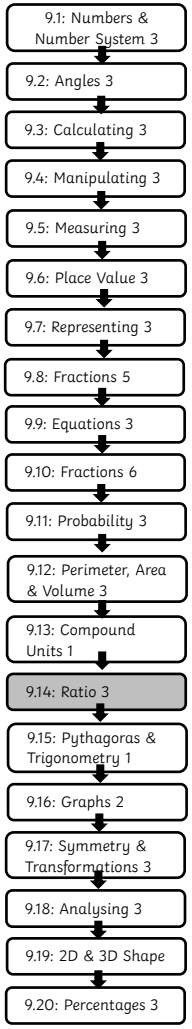

Unit 14 – Ratio 3	Sparx Codes
Use ratio notation to describe the comparison of quantities	M885
Simplify ratios, including those with units	M885
Write a ratio in the form 1 : n or n : 1	M543
Convert between ratios and fractions	M267
Be familiar with a ratio table and multipliers	
Find missing values when given a ratio and the whole or one part	M801
Divide a quantity into parts using a given ratio	M525
Use ratios in real contexts such as map scales, conversions, recipes	
Solve problems involving unit pricing	
Solve problems involving direct proportion Solve problems involving inverse proportion	M478
Identify the graphs of direct and inverse proportion	M448
Identify the equations relating to direct and inverse proportion	M472 M665
Recognise when quantities are in direct or inverse proportion	

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9.10: Fractions 6
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9.13: Compound Units 1
9.14: Ratio 3
9.15: Pythagoras & Trigonometry 1
9.16: Graphs 2
9.17: Symmetry & Transformations 3
9.18: Analysing 3
9.19: 2D & 3D Shape
9.20: Percentages 3

Unit 15 – Pythagoras & Trigonometry 1	Sparx Codes
Identify the hypotenuse in a right-angled triangle (the longest side, opposite the right-angle)	
Know the formula for Pythagoras' Theorem: $c^2 = a^2 + b^2$ where c is the hypotenuse	M677
Use the formula for Pythagoras' Theorem to find lengths in right-angled triangles	
Know the term surd and give exact answers in surd form when required (eg $\sqrt{10}$)	
Label a right-angled triangle with hypotenuse (H), opposite (O) and adjacent (A)	
Know that the ratio O/H is sine/sin of the angle	U605 (GCSE)
Know that the ratio A/H is cosine/cos of the angle	
Know that the ratio O/A is tangent/tan of the angle	
Know the trigonometric ratios SOH CAH TOA	
Use trigonometry to calculate missing lengths in right-angled triangles	U283 (GCSE)
Use trigonometry to calculate missing angles in right-angled triangles	U545 (GCSE)

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Unit 16 – Graphs 2	Sparx Codes
Plot graphs of linear functions written in the form: $y = ax + b$ or $ax + by + c = 0$	M932
Read values for x or y from a graph	
Approximate solutions to simultaneous equations graphically	GCSE U836
Identify and interpret intercept and gradient graphically	M544
Use the form $y = mx + c$ to identify gradient and intercept algebraically	GCSE U477
Use $y = mx + c$ to identify parallel lines	GCSE U377
Use graphs of functions including conversion graphs, distance-time, exponential and reciprocal	M843 M771 M205 M751
Using distance-time graphs	M551 M581 M247 M221
Draw the graph of quadratic functions of the form $y = ax^2 + bx + c$	GCSE U989

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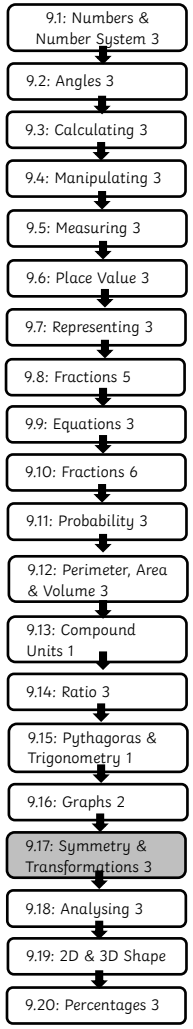

Unit 17 – Symmetry & Transformations 3	Sparx Codes
Draw and describe reflections of 2D shapes	M290
Draw and describe translations of 2D shapes using vectors	M139
Draw and describe rotations of 2D shapes	M910
Solve problems involving rotations, reflections, translations or combinations of them	M881
Describe the resultant of multiple transformations using a single transformation	
Know that a point is 'invariant' if it doesn't move after a transformation	
Know that translation, reflection and rotation produce congruent images (same shape and size)	
Enlarge 2D shapes: - Without a grid or centre of enlargement - Using a centre of enlargement - On a coordinate grid - Using a fraction scale factor	M178
Describe enlargements by giving the centre and scale factor	

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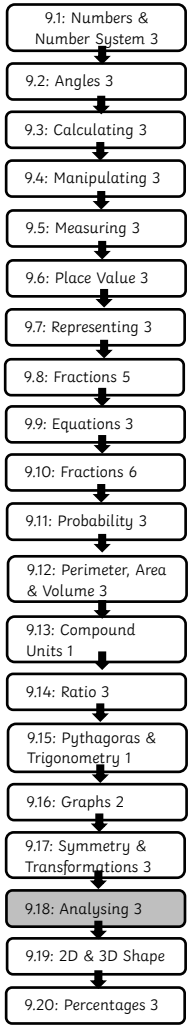

Unit 18 – Analysing 3	Sparx Codes
Understand that measures of central tendency (averages) offer a summary of a set of data	
Find the mode of a list of data	M841
Find the mode from a bar chart or pictogram	
Find the median of a list of n values, where n can be odd or even	M934
Calculate the mean of a list of data values	M940
Understand the range as a measure of spread (or consistency)	M328
Calculate the range from a set of data	
Calculate the range from a bar chart or pictogram	
Be familiar with the term outlier and the effect on range	
Compare sets of data, appreciating the limitations of different statistics	
Calculate the mode, median, range or mean from a discrete frequency table	M127
Calculate an estimated mean from a grouped frequency table	M287
Find the modal group from a grouped frequency table	
Find the group the median lies in, from a grouped frequency table	

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- 9.18: Analysing 3
- **9.19: 2D & 3D Shape**
- 9.20: Percentages 3

Unit 19 – 2D & 3D Shape 3	Sparx Codes
Line symmetry	M523
Rotational symmetry	M523
Properties of scalene/isosceles/equilateral triangles	M276
Names and properties of different quadrilaterals	M276
Names of 2D shapes based on the number of sides	
Vocabulary for circle parts	M595
Know the names and properties of 3D shapes	M767
Planes of symmetry in 3D shapes (these cut a 3D shape into 2 equal and symmetrical halves)	M767
Number of faces, edges and vertices of a 3D shape	M767
Know the link between faces, edges and vertices in a 3D shape	M767
Nets of 3D shapes (identify shapes from nets or draw nets)	M518
Construct and interpret plans and elevations of 3D shapes	M229
Use isometric paper to interpret or draw 3D shapes	

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- 9.18: Analysing 3
- 9.19: 2D & 3D Shape
- **9.20: Percentages 3**

Unit 20 – Percentages 3	Sparx Codes
Write a percentage as a fraction and decimal	M264
Convert between fractions, decimals and percentages with or without a calculator	M264
Know the calculator converter function keys	
Find a percentage of an amount without a calculator	M437
Calculate the percentage of an amount with a calculator using a decimal or fraction multiplier	M905
Increase or decrease by a percentage without a calculator	M476
Use fraction/decimal multipliers to increase or decrease by a percentage	M533
Work with percentages over 100% and decimal percentages	
Express one number/quantity as a percentage of another	M235
Compare quantities using percentages	
Find the percentage an amount has changed by (percentage change = actual ÷ original or percentage change = finish ÷ start)	U278 (GCSE)
Solve simple interest problems	U533 (GCSE)
Solve compound interest problems	U332 (GCSE)
Find the original value in percentage problems	M528

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