Year 11 Autumn T1 – Topic: Linear Graphs

Prior learning:

- Understand the terms 'perpendicular lines' and 'parallel lines'
- Use coordinates in the first quadrant, such as plot the point (3,2)
- Use coordinates in all four quadrants, such as plot the points (3,-2), (-2,1) and (-4,-3)
  - Add, subtract, multiply and divide integers
  - Find multiples of a number

- Substitute positive and negative numbers into a formula such as P = 2l + 2w
- Recognise and describe arithmetic and geometric sequences
- Generate a sequence of numbers or diagrams from a term-to-term rule
- Write the term-to-term rule of a simple sequence

- Find the nth term of a sequence or a series of diagrams
- Generate a sequence of a series of diagrams given the nth term
- Find a particular term in a sequence
- Justify whether a number is a term of a sequence

		Learning sequences						Endpoints
		Grade 3	MW	Grade 4- 5	MW	Grade 8	MW	
Main learning Steps		• Find coordinates of points determined by geometrical information • Understand the equation of a straight line, interpreting the gradient and intercept • Using ratio to find the gradient base:height • Find the gradient of a straight-line graph • Find the gradient of a line given two coordinates	113 3 3 3	• Find midpoints of two coordinates (2D and 3D) • Sketch a linear function from its equation • Find the equation of a straight line from a graph • Find the equation of a straight line given two coordinates • Find the equation of a straight line given a parallel line and a point • Interpret a straight line graph in a real life context • Interpret the gradient of a graph in the context of a question • Interpret the intercept of a graph in the context of a question • Draw and interpret distance-time graphs • Work out an average speed from a distance-time graph	133 159a 159b 159b 143 143	• Introduce f(x) notation • Find the gradients of perpendicular straight-line graphs • Prove two lines are parallel or perpendicular • Find the equation of a straight line given a perpendicular line and a point	208 208	• Work with coordinates in all four quadrants • Identify gradients and intercepts of straight line graphically and algebraically • Use the form y=mx+c to identify parallel lines • Use the form y=mx+c to identify perpendicular lines (H) • Find the equation of a straight line give coordinates • Identify the gradient of a straight line graph as a rate of change. • Use graphs to solve problems involving distance, speed and acceleration.
Assessments		o End of Block Test o In class exit tickets and Homework o Mid and End of year tests						

Year 11 Autumn T1 – Topic: Handling Data

Prior learning:
- Use probabilities given to calculate expected values (capture/recapture)
- Use stratified sampling methods
- Product rule for counting

Learning sequences							Endpoints

	Grade 1-2	MW	Grade 3	MW	Grade 4	MW	
Main learning Steps	• Design and use tally charts • Construct and interpret a pictogram • Construct and interpret a bar chart • Group data in equal class intervals • Extract and interpret information presented in simple tables • Find the mode for a set of numbers • Write down the mode from a graph • Find the median for an odd set of numbers • Find the median for an even set of numbers • Calculate the mean for a set of numbers • Solve complex mean problems • Work out the range for a set of numbers • Find the Interquartile range of a set of numbers • Compare the averages and range of two sets of data • Find the total from a frequency table • Design and use a frequency diagram (bar chart for grouped data) • Construct and interpret a composite or dual bar chart • Construct and interpret a vertical line chart • Complete and use two-way tables for discrete and grouped data • Design two-way tables to solve multi-step problems • Construct and interpret a stem-and-leaf diagram	15 16 15 65 62 62 62 62 62 62 62 62 65 64 61 61 128b	• Find the modal value from a discrete frequency table • Find the modal class for grouped data • Find the median and quartiles from a discrete or grouped frequency table • Find the mean from a frequency table • Find an estimate of the mean for grouped data • How to construct and interpret step graphs. • Construct a pie chart • Interpret a pie chart • Draw a scatter graph by plotting points on a graph • Identify the type and strength of correlations • Draw a line of best fit on the scatter graph • Interpret scatter graphs (excluding correlation)	130a 130a 130a 130a 130b 128 128 129 129 129 129	• Complete a time series graph • Interpret a time series graph using trend lines • Recognising when and why graphs can be misleading.	153 153	• Construct and interpret frequency tables and two-way tables • Construct and interpret pictograms, bar-line charts and bar charts • Interpret and construct pie charts and know their appropriate use. • Compare distributions using median, mean, mode and range and identify outliers. • Calculate the inter-quartile range of a data set and use this to compare data sets. (H) • Interpret and construct tables, graphs and charts for discrete, continuous and grouped data. • Use median, mean, modal class and range to interpret and compare distributions. • Use correlation to describe scatter graphs but know that it does not imply causation. • Draw estimated lines of best fit and make predictions but understand their limitations. • Interpret and construct line graphs for time series data. • Cumulative frequency (H) • Box plots (H) • Histograms (H)
					Grade 6 &7	**MW**	
					• Construct a frequency polygon • Construct and interpret a box plot • Construct and interpret cumulative frequency diagram (excluding IQR and median) • Use a cumulative frequency diagram to estimate the median and interquartile range • Compare two or more distributions (median, range, IQR) and make a contextual statement • Construct and interpret a histogram with unequal class intervals • Calculate estimates of statistical measures from graphical representations of grouped data	65b 187 186 186 187 205	

Year 11 Autumn T1 – Topic: Trigonometry

Prior learning:

- Rearrange linear formulae such as p = 3q + 5
- Substitute positive and negative numbers into a formula such as P = 2l + 2w
- Convert between fractions, decimals and percentages

- Represent ratios
- Use the fact that the angles of a triangle add up to 180º to find angles
- Use Pythagoras' theorem to find missing sides

- Solve one step equations such as 3x = 12 or x + 5 = 9
- Solve two step equations such as 3x -1 = 9 and 3(x+4) = 15 Understand the terms

	Learning sequences				Endpoints
	Grade 5	MW	Grade 7+	MW	
Main learning Steps	• Label the vertices and sides of a triangle • Understand that sine, cosine and tangent are ratios • Know the exact trigonometric values for (30°, 45°, 60°, 90°) • Use trigonometry to find missing side lengths in right angled triangles • Use trigonometry to find missing angles in right angled triangles • Use trigonometry to calculate angles of elevation	173 168 168	• 3D Trigonometry • Pythagoras and Trigonometry • Use the sine rule to find missing sides and angles in non-right angled triangles • Use the cosine rule to find missing sides and angles in non right angled triangles • Find the area of triangles using ½absinC	218 201 202 203	• Use trigonometric ratios to find missing lengths and angles in triangles • Find the exact values of sinθ, cosθ and tanθ for key angles. • Use the sine and cosine rules to find missing lengths and angles. (H)
Assessments	o End of Block Test o In class exit tickets and Homework o Mid and End of year tests				

Where will we use these ideas again:	Higher:
This is often linked to areas and perimeters of shapes	Will be revisiting trigonometry when looking at cosine and sine rules. These topics will also be linked to bearings, linear and circle graphs, circle theorems

Year 11 Autumn T2 (Higher only) – Circle Theorems

Prior learning:

- Draw diagrams from written descriptions
- Estimate angles and measure them accurately
- Draw angles accurately
- Construct a circle using a pair of compasses, given a centre and a point on the circumference
- Understand the term equidistant
- Understand and use the perpendicular distance from a point to a line as the shortest distance to the line
- Know the definition of a circle and identify the, centre, radius, diameter and circumference
- Recognise complex parts of circle such as tangents, arcs, sectors, chords and segments
- Use the fact that the angles of a triangle add up to 180º to find angles
- Use angles in a quadrilateral add up to 360

	Learning sequences				Endpoints
	Grade 6	MW	Grade 7+	MW	
Main learning Steps	• Use and apply the six circle theorems • Prove that the angle at the centre is twice the angle at the circumference • Prove that angles in semi-circle are equal to 90° • Prove the same segment theorem • Prove the alternate segment theorem • Recognising the similar triangles formed when two chords intersect	183 184 184 184 184	• Use the intersecting chords theorem to find length • Secant Theorem • Opposite angles of a cyclic quadrilateral add to 180° • Pythagoras' Theorem with circle theorems	183	• Prove and apply circle theorems (H)
Assessments	o End of Block Test o In class exit tickets and Homework o Mid and End of year tests				

Where will we use these ideas again: Circle theorems are often included in questions involving circle graphs	

Year 11 Autumn T2 (Foundation) – Angles Review, Construction, Congruence, Similarity and Loci

Prior learning:

- Understand the word congruent and identify congruent shapes
- Draw diagrams from written descriptions
- Measure a line accurately to the nearest millimetre
- Construct simple shapes on squared paper
- Estimate angles and measure them accurately
- Draw angles accurately

- Construct a circle using a pair of compasses, given a centre and a point on the circumference
- Understand the term equidistant
- Understand and use the perpendicular distance from a point to a line as the shortest distance to the line

Learning sequences						Endpoints
Main learning Steps	**Grade 2**	**MW**	**Grade 4**	**MW**		• Measure line segments and angles accurately
	• Draw an SAS triangle with ruler and protractor • Draw an ASA triangle with ruler and protractor	47 47	• Find the lengths in similar shapes • Understand the word "similar" and be able to identify similar shapes	144 144		• Describe and apply the properties of angles at a point, on a line and at intersecting and parallel lines.
	Review Topics	**MW**	• Understand the word "congruent" and be able to identify congruent shapes			• Derive and use the sum of angles in a triangle
	• Recognise corresponding, alternate and co-interior angles	120	• Understand and apply mathematical similarity • Draw an SSS triangle with ruler and compasses	144 147		• Derive and apply the properties and definitions of special types of triangles and quadrilaterals
	• Recognise vertically opposite angles and know that they are equal • Understand why some shapes tessellate and others do not	12a	• Draw a quadrilateral such as a kite or a parallelogram with given measurements with ruler and protractor			• Identify and use congruence and similarity
	• Use the fact that the angles of a triangle add up to 180º to find angles • Use angle properties of isosceles, equilateral and right-angled triangles	122	• Use angle facts to prove triangles are congruent in more complex questions (e.g. bow tie question) • Construct the perpendicular bisector of a line	166 146a		• Deduce and use the angle sum in any polygon
	• Calculate interior and exterior angles of a quadrilateral • Calculate the sum of angles in any polygon • Calculate exterior and interior angles of a regular polygon	122 123 123	• Construct the angle bisector • Construct the perpendiculars to and from a point • Construct the angles of 60º and 90º with a ruler and compass	145 146b 145		• Calculate interior and exterior angles for regular polygons
	• Prove that the angles of a triangle add up to 180º and use this to find angles	121	**Grade 5**	**MW**		• Construct triangles • Use the standard ruler and compass constructions
	• Prove the exterior angle of a triangle is equal to the sum of the two interior angle • Prove that the angles in a quadrilateral add up to 360°	123 123	• Given two triangles are congruent, state the reason (SAS, ASA, SSS, RHS) • Prove that two triangles are congruent	166 166		• Solve loci problems
Assessments	o End of Block Test o In class exit tickets and Homework o Mid and End of year tests					

Year 11 Autumn T2 – Bearings and Scale Drawings

Prior learning:

- Estimate angles and measure them accurately
- Draw angles accurately
- Recognise corresponding, alternate and co-interior angles
- To be able to convert between metric units such as m to cm, kg to g, litres to ml
- Be familiar with the unitary method
- Calculate parts of a ratio given one quantity

	Learning sequences						Endpoints
	Grade 2	MW	Grade 3	MW	Grade 7+	MW	
Main learning Steps	- Estimate angles and measure them accurately - Draw angles accurately - Be familiar with the unitary method	46a 46b 42	- Recognise corresponding, alternate and co-interior angles - To be able to convert between metric units such as m to cm, kg to g, litres to ml - Calculate parts of a ratio given one quantity - Know the three rules of bearings - Find the bearing between two points - Draw a point on a fixed bearing from another point - Given a bearing, find the reverse bearing - Use and interpret map scales - Draw and interpret scaled diagrams in real-life contexts	120 112 106 124 124 124 124 124	Bearings with Pythagoras and Trigonometry		- Use scale factors, scale diagrams and maps. - Measure line segments and angles accurately - Interpret maps and scale drawings - Use bearings - Use bearings to specify directions (H)
Assessments	o End of Block Test o In class exit tickets and Homework o Mid and End of year tests						

Where will we use these ideas again: Bearings will be revisited again with trigonometry and angles in parallel lines Scale drawings as a concept is revisited within enlargement	Higher: In addition, bearings with sine rule and cosine rule

Year 11 Autumn T2 – Graphs 2

Prior learning:

- Use coordinates in the first quadrant, such as plot the point (3,2)
- Use coordinates in all four quadrants, such as plot the points   (3,-2), (-2,1) and (-4,-3)
- Perform addition and subtraction calculations involving negatives
- Perform multiplication and division calculations involving negatives
- Solve one step equations such as 3x = 12 or x + 5 = 9
- Solve two step equations such as 3x -1 = 9 and 3(x+4) = 15
- Rearrange linear formulae such as p = 3q + 5
- Substitute positive and negative numbers into a formula such as P = 2l + 2w
- Plot the graphs of horizontal lines such as y=4 and vertical lines such as x=3

- Draw the graph for equations such as y = 2x + 3 and recognise these are linear
- Solve problems involving graphs, such as finding where the line y = x + 2 crosses the line y = 1
- Draw graphs of quadratic functions such as y = 3x² and y = x² + 4 using a table of values
- Use graphs to find the approximate solutions of quadratic equations
- Sketch a simple quadratic function such as y = x² + 4
- Identify the turning points of a quadratic graph
- Identify the roots and intercepts from a quadratic graph
- Using symmetry, identify the turning points of a quadratic graph

Learning sequences							Endpoints
	Grade 3&4	MW	Grade 5	MW	Grade 7-8	MW	
Main learning Steps	• Solve problems involving graphs, such as finding where the line y = x + 2 crosses the line y = 1 • Solve simultaneous equations graphically • Draw graphs of quadratic functions such as y = 3x² and y = x² + 4 using a table of values • Use graphs to find the approximate solutions of quadratic equations • Sketch a simple quadratic function such as y = x² + 4	96 140 98 98 99	• Plot and draw a cubic graph • Recognise and sketch simple cubic functions • Recognise non-linear graphs and their equations • Plot and draw a reciprocal graph • Recognise and sketch simple reciprocal functions • Plot and draw an exponential graph • Set up and solve (algebraically) two linear simultaneous equations in two variables, interpreting the solution in context • Solve a pair of simultaneous linear equations algebraically • Identify the turning points of a quadratic graph • Identify the roots and intercepts from a quadratic graph • Using symmetry, identify the turning points of a quadratic graph	161 161 98 162 162 160 160 160	• Recognise and sketch the exponential graph • Solve problems involving the exponential function • Complete the square by rewriting quadratics • Use completing the square to solve equations • Use completing the square to find maximum and minimum values • Know and use the equation of a circle • Find the equation of a circle • Find the equation of a tangent to a circle • Sketch a more complex quadratic graph, finding the turning points by completing the square	194 194 209a 209b 209c 197 197 160	• Draw graphs to identify and interpret roots, intercepts and turning points of quadratic functions. • Solve quadratic equations by finding approximate solutions using a graph. • Recognise and draw graphs of cubic and reciprocal functions • Recognise and draw graphs of exponential functions (H) • Recognise and draw graphs of trigonometric functions. (H) • Recognise and use simple equations of circles and find the tangent to a circle at a point. (H)
Assessments	o End of Block Test o In class exit tickets and Homework o Mid and End of year tests						

Year 11 Autumn T2 – Ratio Review

	Learning sequences							Endpoints
	Grade 2	MW	Grade 3	MW	Grade 5	MW		
Main learning Steps	• Represent ratios • Simplify ratios • Solve recipe problems involving ratio	38 38 39	• Share a quantity into a given ratio • Calculate parts of a ratio given one quantity • Recognise the relationships derived from equivalent ratios	106 106 107	• Convert a ratio into an equation	106/ 165c		• Divide a quantity in a given ratio and reduce a ratio to its simplest form.
					Grade 7+			
					• Harder ratio and equations • Harder worded questions with ratios	200bc 200a		
Assessments	o End of Block Test o In class exit tickets and Homework o Mid and End of year tests							

Year 11 Spring T1 – Combined Events

Prior learning:

- Fractions – 4 operations
- Decimals – 4 operations
- Express a probability as a fraction, decimal or percentage
- Use the fact that the probabilities of mutually exclusive outcomes add up to 1 and complete a probability table
- Use the fact that the probabilities of mutually exclusive outcomes add up to calculate other probabilities (the OR rule)

- Solve equations from probability problems
- List outcomes systematically
- Use a sample space or a list to find probability of two events happening
- Write all the combinations from a list
- Identify permutations from a list
- Draw a sample space
- Use a two-way table to find a probability
- Design and use frequency trees

- Understand and use relative frequency / experimental probability
- Use probability to estimate outcomes for a population
- Understand the term set
- Recognise and define the universal set
- Sort data into a Venn diagram
- Find the intersection from a Venn diagram
- Find the union from a Venn diagramEstimate angles and measure them accurately

Learning sequences							Endpoints
	Grade 3	**MW**	**Grade 6**		**Grade 7**	**MW**	
Main learning Steps	• Complete and use Venn diagrams to find frequencies • Recognise and use the notation for intersection, union and complement • Design a Venn diagram to solve multi-step problems	127a 127b 127a	• Find probabilities of dependent events from a tree diagram • Understand the concept of conditional probability • Find conditional probability from a table, Venn diagram or tree diagram • Use a Venn diagram to calculate probability • Use set notation when describe probabilities • Extend understanding of Venn Diagrams to three regions • Forming equations with dependent events	151 175 185 185 185	• Find probabilities of successive independent events without a tree diagram • Find the probability of a combination of mutually exclusive events from a tree diagram (the OR rule) • Find probabilities of successive dependent events without a tree diagram	204 204 204	• Use Venn diagrams to represent sets, to record outcomes and to calculate probabilities of events. • Use tree diagrams to show the frequencies or probabilities of two events • Calculate the outcome of two experiments with or without a tree diagram. • Calculate conditional probabilities.
	Grade 4 & 5	**MW**					
	• Complete a probability tree diagram involving independent events • Find probabilities of successive independent events from a tree diagram • Understanding how probabilities change in experiments without replacement • Complete a probability tree diagram involving dependent events (e.g. without replacement) • Find the probability of an event occurring given information as ratios • Understand the concept of conditional probability	151 175 175 175					
Assessments	o End of Block Test O In class exit tickets and Homework O Mid and End of year tests						

Year 11 Spring T1 – Units and Proportionality

Prior learning:

- Solve questions involving best value for money
- Solve simple direct proportion (e.g. given the cost of 5 items, find the cost of 3)
- Be familiar with the unitary method
- Understand and use compound measures (SDT, DMV, FPA etc) in simple questions
- Understand and use compound measures (SDT, DMV, FPA) in more complex questions involving more than one part
- Know the conversions for metric units and money

Learning sequences							Endpoints
Main learning Steps	Grade 3	MW	Grades 4 & 5	MW	Grade 7+	MW	• Solve direct and inverse proportion problems. • Describe direct and inverse proportion relationships using an equation. • Recognise graphs showing direct and inverse proportion
	• Solve proportion problems involving exchanging money • Draw and/or use conversion graphs, including for temperature and currency conversion • Convert between imperial and metric units such as cm to inches, kg to lbs, litres to pints given the conversions	105 107	• Convert between different units of compound measures • Solve indirect proportion questions involving work rate (e.g. how many man-hours) • Recognise graphs showing direct and inverse proportion	199	• Understand and solve simple problems involving direct proportion (y α x) • Understand and solve simple problems involving indirect proportion (y α 1/x) • Recognise the graphs showing direct and inverse proportion • Understand and solve more complex problems involving direct and indirect proportion (y α x²)	199 199 199 199	
Assessments	o End of Block Test o In class exit tickets and Homework o Mid and End of year tests						

Year 11 Spring T2 (Higher only) – Functions and Proof

Prior learning:

- Algebraic expressions – manipulation, factorisation, expanding brackets
- Number facts even + odd = odd etc
- Divisibility rules
- Changing the subject
- Substitution
- F(x) notation
- Plotting graphs

Learning sequences					Endpoints
Grade 5	MW	Grade 8	MW		
• Use mathematical reasoning (e.g. counter-example) to prove or disprove arithmetic statements	156	• Evaluate functions by substituting values of x • Find the inverse of a basic function where x appears only once	215 214a	• Write an equation to represent a function, and find inputs and outputs. • Find the inverse of a function and construct and use composite functions. • Construct proofs of simple statements using algebra.	
Grade 7	MW	• Find the inverse of a basic function where x appears more than once	214b		
• Complete algebraic proofs	193	• Define a composite function • Evaluate a composite function by substituting values of x • Solve equations involving functions and composite functions • Evaluating functions with indices	215 215 215		

Assessments	o End of Block Test
	o In class exit tickets and Homework
	o Mid and End of year tests

Note: "Main learning Steps" label appears vertically along the left side of the learning sequences table.

Year 11 Spring T2 (Foundation only) – Algebra Review and Proof

Prior learning:

- Algebraic expressions – manipulation, factorisation, expanding brackets
- Number facts even + odd = odd etc
- Divisibility rules
- Changing the subject

- Substitution
- F(x) notation
- Plotting graphs

Learning sequences							Endpoints
Main learning Steps	Grade 1 -2/Acquiring	MW	Grade 3/Working Towards	MW	Grade 4/on track	MW	- Use algebraic notation - Substitute numbers into formulae and expressions - Use and understand the words expressions, equations, formulae, terms and factors - Collect like terms and simplify expressions involving sums, products, powers and surds. - Expand single brackets - Factorise into single brackets - Application of rules of indices to algebra - Linear inequalities - Algebraic fractions - introduction (H)
	- Know and use correct algebraic conventions (e.g. 4 x x = 4x, m/2) and form simple algebraic expressions from a given scenario - Understand what expressions, equations, formulae and identities are - Simplify expressions involving addition and subtraction with one variable such as a+2a+3a - Simplify expressions involving addition and subtraction with more than one variable such as 2a + 5b - a -2b - Simplify expressions by multiplying expressions - Simplify expressions by dividing expressions - Use correct algebraic notation understanding the terms input and output - Understand how to translate basic phrases into algebra (e.g. more than, less than, double) - Form simple algebraic expressions from a given scenario - Understand what a formula is - Use a formula written in words, such as Cost = 20 x distance travelled	7 33 33 34 35 7	- Expand a single set of brackets such as 3(x + 2) and 4x(x-3y - Factorise expressions such as 6a + 8 and x² - 3x - Substitute positive and negative numbers into a formula such as - P = 2l + 2w - Substitute numbers into more complicated formulae such as - C = (A+1)D/9 - Solve one step equations such as 3x = 12 or x + 5 = 9	93 94 95 95 135	- Solve equations with the variable on both sides such as 3(x - 4) = 5 + x - Apply the multiplication and division law of indices to simplify algebraic expressions such as 3wx²y³ x 6w²xy - Represent simple inequalities on a number line - Solve linear inequalities - Represent solutions to inequalities using set notation	135 135 138 139	
			Grade 4/on track	MW	Grade 5/On Track	MW	
			- Apply the multiplication and division law of indices to simplify algebraic expressions such as 3wx²y³ - Expand and simplify expressions such as x(x² - 5) and 3(x+2) - 5(2x-1) - Factorise expressions such as 6a + 8 and x² - 3x - Form equations and formulae from a given scenario - Rearrange linear formulae such as p = 3q + 5 - Solve two step equations such as 3x -1 = 9 and 3(x+4) = 15	131 134a 94 137 136 135	- Use mathematical reasoning (e.g. counter-example) to prove or disprove arithmetic statements - Understand what an identity is by using reasoning to show two expressions are equivalent - Use index notation and index laws for negative powers	156 193 154	
					Grade 7+ /extending	MW	
					- Rearrange formulae that include brackets, fractions and square roots - Rearrange formulae where the variable appears twice - Use algebra to prove identities - Use index notation and index laws for fractional powers - Simplify algebraic fractions (linear factorising)	190 190 193 188 210a	

Year 11 Spring T2 – Vectors

Prior learning:
- Column vectors
- Draw column vectors
- Translations
- Collect like terms

Learning sequences					Endpoints
	Grade 3	MW	Grade 8 & 9	MW	
Main learning Steps	• Represent a two-dimensional vector as a column vector	174	• Understand that parallel vectors are multiples of each other • Solve simple geometric problems in 2-D using vector methods	219 219	• Write column vectors and draw vector diagrams • Express vectors in terms of simple base vectors
	Grade 5	MW			
	• Multiply and divide vectors by scalars • Add and subtract vectors and/or multiples of vectors	174 174			
Assessments	o End of Block Test o In class exit tickets and Homework o Mid and End of year tests				

Year 11 Spring T2 (Foundation only) – Numbers Review

	Learning sequences						Endpoints
	Grade 1 & 2	MW	Grade 3	MW	Grade 3	MW	
Main learning Steps	• Find the factors of a number • Find multiples of a number • Identify prime numbers • Recognise special types of numbers (even, odd, squares, cubes, factors, multiples) • Rewrite repeated multiplication using powers • Understand the meaning of roots • Apply the multiplication and division rule of indices to numbers • Use simple fractions to describe proportions of a whole • Shade in a fraction of a picture • Use shading to determine which fraction is bigger • Convert between improper and mixed fractions • Identify and find equivalent fractions • Simplify fractions • Compare two fractions with the same denominator • Understand that percentage means "out of 100" • Write down the place value of an integer digit, e.g. the 4 in 24,201 • Order integers up to the ten thousands place	28 28 28 28 29 29 24 24 24 25 26 70 40/85 71ab 1 2	• Express one quantity as a percentage of another using a calculator • Express one quantity as a percentage of another using non-calculator methods • Increase or decrease a quantity by a given percentage • Calculate simple interest & depreciation • Calculate a percentage increase or decrease using a multiplier • Work out reverse percentage problems • Work out the percentage change • Write a fraction or percentage from a given ratio and vice versa • Write a number as a product of prime factors • Find the HCF of two numbers using appropriate methods • Find the LCM of two (or more) numbers using appropriate methods • Calculate squares and square roots (with and without calc) • Calculate cubes and cube roots (with and without calc) • Evaluate calculations involving powers • Estimate square and cube roots • Know how to find roots (including using approximation) • Express fractions as percentages • Compare percentages, fractions and decimals • Calculate percentage of an amount using calculator methods • Calculate percentage of an amount using non-calculator methods • Multiply integers with decimals • Divide a decimal by an integer	88 89 108 111 108 110 109 38 78 79 80 81 81 82 81 85 85 86 87 66 67	• Compare two fractions with different denominators using common denominators • Order a set of fractions • Express fractions as decimals • Express decimals as fractions in their simplest form • Express percentages as fractions in their simplest form • Find fraction of an amount • Multiply vulgar (non-mixed) fractions • Divide vulgar (non-mixed) fractions • Perform multiplication and division calculations involving mixed numbers • Find the reciprocal of a number • Add and subtract vulgar (non-mixed) fractions with different denominators • Perform addition and subtraction calculations involving mixed numbers • Convert between decimals and percentages	70 84 84 85 72 73 74 76 71ab 85	• Use fractions and percentages to describe a proportion • Solve problems involving percentage change. • Calculate percentage increases and decreases using multiplication. • Use place value when calculating with decimals • Order positive and negative integers using the symbols =, ≠,<, >,≤,≥ . • Round to a number of decimal places or significant figures • Add and subtract positive and negative integers and decimals • Multiply and divide positive and negative integers and decimals • Use order of operations in multi-stage calculations. • Round numbers and measures to an appropriate degree of accuracy. • Use approximate values obtained by rounding to estimate calculations • Use inequality notation to state error intervals and interpret limits of accuracy. • Find the upper and lower bounds on the value of a quantity that has been rounded. • Find the upper and lower bounds of calculations and represent this to an appropriate degree of accuracy. • Find fractions and percentages of amounts • Add, subtract, multiply and divide with fractions and mixed numbers • Convert between fractions, decimals, and percentages

				Grade 4		
• Recognise place value beyond 10000	2	• Perform addition and subtraction calculations involving negatives	68a	• Apply the multiplication and division law of indices to simple numeric expressions such as $3^2 \times 3^3$ and $5^3/5^2$	131	• Order fractions, decimals and percentages.
• Add integers	17	• Perform multiplication and division calculations involving negatives	68b			• Know and use the language of prime numbers, factors and multiple
• Add integers and decimals	17	• Perform a mixture of operations on negative numbers		• Find and use the upper and lower bounds of rounded numbers	132	• Write a number as a product of its prime factors
• Add decimals	17	• Round numbers to a given number of significant figures	90	• Find the error interval of a rounded number	155	• Find the HCF and LCM of a pair of integers by listing and using Venn diagrams
• Subtract integers	18	• Multiply a decimal by a decimal	66	• Find the error interval of truncated numbers		• Calculate positive integer powers and their roots.
• Subtract involving decimals and integers	18	• Divide an integer by a decimal	67	• Understand the difference between the bounds of discrete and continuous quantities		• Estimate the square or cube root of an integer
• Subtract decimals		• Divide a decimal by a decimal	67			• Apply the laws of indices to numerical expressions
• Multiply integers	18	• Use order of operations accurately	75			
• Divide integers	19	• Use a calculator to perform complex calculations	77			
• Find the half-way value between two integers	20	• Using place value knowledge to manipulate a given calculation		**Grade 5**		
• Write down the place value of a decimal digit, e.g. the 4 in 0.24	27	• Estimate answers to calculations	91	• Work out compound interest and depreciation	164	
• Order decimals up to 3 decimal places	1	• State whether an estimation is an over- or underestimate	91	• Understand how to use successive percentages in other situation		
• Find the half-way value between two numbers (including decimals)	3	• Express one quantity as a percentage of another using a calculator	88	• Evaluate negative powers	154	
• Round an integer to the nearest power of 10	27	• Express one quantity as a percentage of another using non-calculator methods	89	• Use index notation and index laws for negative powers	154	
• Round decimals to the nearest decimal place	31	• Increase or decrease a quantity by a given percentage	108	• Work out compound interest and depreciation	164	
• Solve questions involving negative numbers in real life (e.g. temperature, golf scores, sea level	32	• Calculate simple interest & depreciation	111	• Understand how to use successive percentages in other situations		
• Add and subtract vulgar (non-mixed) fractions with the same denominator	23	• Calculate a percentage increase or decrease using a multiplier	108			
		• Work out reverse percentage problems	110			
		• Work out the percentage change	109			
		•				

Assessments	o End of Block Test
	o In class exit tickets and Homework
	o Mid and End of year tests

Year 11 Spring T2 – Graphs 3

Prior learning:
- Draw a velocity-time graph
- Know the exact trigonometric values for (30°, 45°, 60°, 90°)

Learning sequences					Endpoints
Main learning Steps	Grade 3	MW	Grade 8 & 9	MW	• Recognise and draw graphs of cubic and reciprocal functions • Recognise and draw graphs of exponential functions (H) • Recognise and draw graphs of trigonometric functions. (H) • Recognise and sketch transformations of graphs (H) • Approximate the gradient of a curve at a given point and the area under the graph. Interpret these values in real-life problems including kinematic graphs. (H)
	• Recognise graphs from real life scenarios (e.g. filling different flasks)		• Calculate acceleration from a velocity-time graph • Calculate the distance travelled from a velocity-time graph	216 216	
	Grade 7	MW	• Estimate the gradient of a tangent to a curve • Find the gradient to a tangent of a curve		
	• Recognise and draw the graphs of sine and cosine • Recognise and draw the graph of tangent • Evaluate the sine, cosine and tangent of angles greC and represent solution as a region of a graph	195 196 195/196 195/196 196a 196b 196	• Find the area under a graph made up of straight lines • Find the area under a curve using rectangles • Find the area under a curve using trapezia • Derive and use the SUVAT formulae from kinematic graphs • Use completing the square as a transformation of x² to sketch a graph • Solve quadratic inequalities graphically	216 209c 212	
Assessments	o End of Block Test o In class exit tickets and Homework o Mid and End of year tests				

Year 11 Spring T2 (Foundation only) – Measures Review

Prior learning:
Be able to find the area and perimeter of a shape by counting squares, and calculate the area of a rectangle
Be able to apply multiplication and division
Identify isosceles, equilateral, scalene and right-angled triangles
Recognise and name shapes such as square, parallelogram, rhombus, trapezium and hexagon

Learning sequences							Endpoints
	Grade 1-2	MW	Grade 3	MW	Grade 4-5	MW	
Main learning Steps	• Understand the terms 'perpendicular lines' and 'parallel lines' • Work out the perimeter of a rectangle • Work out the perimeter of compound shapes • Know and use the formula for the area of a triangle • Know and use the formula for the area of a parallelogram • Know and use the formula for the area of a trapezium • Convert between hours, minutes and seconds • Convert between the 12 and 24 hour clock • Calculate the difference between two times using the number line method • Calculate the difference between two times using the arithmetic method • Interpret a distance table • Interpret timetables • Draw a cuboid on an isometric grid and mark its dimensions • Draw 3-D shapes on isometric paper	52 54 55 56 6a 6a 6a 6a 6b 6b	• To be able to convert between metric units such as m to cm, kg to g, litres to ml • Classify quadrilaterals by their geometric properties • Find the area of compound shapes • Derive and use the formula for the area of special compound shapes (kite, rhombus) • Solve tiling problems involving area calculations • To be able to convert between metric units such as m to cm, kg to g, litres to ml • Know the definition of a circle and identify the, centre, radius, diameter and circumference • Calculate the circumference of a circle to an appropriate degree of accuracy • Find the perimeter of a semicircle and quarter circle • Calculate the area of a circle to an appropriate degree of accuracy • Find the area of a semicircle or quarter circle • Know the definition of a circle and identify the, centre, radius, diameter and circumference	112 116 118 118 117 116	• Understand and use compound measures (SDT, DMV, FPA etc) in simple questions • Understand and use compound measures (SDT, DMV, FPA) in more complex questions involving more than one part • Rates of pay • Rates of flow • Recognise complex parts of circle such as tangents, arcs, sectors, chords and segments • Find the lengths of arcs and perimeters of sectors of a circle • Find the area of a sector of a circle • Compound shapes with areas – perimeter and area • Find the area of segments of circles • Calculate the surface area of more complex prisms • Find the surface area of spheres • Find the surface area of cones • Find the surface area of a pyramid • Find the volumes of spheres • Find the volume of a pyramid • Find the volume of cones • Solve algebraic problems involving the surface area/volume of complex shapes • Find the volume of a frustum	142 142 149 167 167 169 171 169 170 171 169-171 172	▪ Calculate the areas of triangles, parallelograms, trapezia and composite shapes ▪ Identify the number of faces, edges and vertices of 3D shapes ▪ Construct and interpret plans and elevations of 3D shapes. ▪ Calculate the volume of cuboids, cylinders and other prisms. ▪ Apply the formulae for volume and surface area of spheres, pyramids, cones and composite solids. ▪ Identify and apply circle definitions and properties ▪ Find the area and circumference of a circle and composite shapes involving circles ▪ Describe and apply the properties of angles at a point, on a line and at intersecting and parallel lines. ▪ Derive and use the sum of angles in a triangle ▪ Derive and apply the properties and definitions of special types of triangles and quadrilaterals

	• Name and state properties of 3D shapes, such as vertices, edges and faces	43	• Find the volume of a cube/cuboid	115		▪ Solve geometrical problems on coordinate axes
	• Identify basic 3-D solids	43	• Find the height of a cuboid, given volume, length and breadth	115		▪ Identify and use congruence and similarity
	• Sketch 3-D solids	43	• Calculate volumes of prisms	119		▪ Deduce and use the angle sum in any polygon
	• Find the volume of a solid by counting cubes and stating units		• Convert between square and cubic metric units (mm2 to m2 or cm³ to litres)	112		▪ Calculate interior and exterior angles for regular polygons
	• Recognise nets of familiar 3-D shapes, e.g. Cube, cuboid, triangular prism, square based pyramid	44	• Calculate volumes of cylinders			
	• Draw the net of a cuboid	44	• Solve boxing problems involving volume calculations			
	• Draw and interpret plans and elevations of 3-D solids	51	• Calculate the surface area of a cuboid	114a		
	• Construct and recognise the nets of 3-D solids such as pyramids and triangular prisms	44	• Calculate the surface areas of cylinders	114b		
	• Draw a 3-D solid given its plan and elevations	51	• Calculate the surface areas of a triangular prism			
Assessments	o End of Block Test					
	o In class exit tickets and Homework					
	o Mid and End of year tests					