ARNOLD LODGE
4 - 18 yrs Co-educational Independent Day School

KS3: Mathematics Scheme of Work

Year 7 Mathematics

The year 7 curriculum is taught in the order shown below.

	Topic	What is covered?
HT1	SEQUENCES	1. Describe and continue a sequence given diagrammatically. 2. Predict and check the next term(s) of a sequence. 3. Continue numerical linear sequences. 4. Continue numerical non-linear sequences. 5. Recognise the difference between linear and non-linear sequences. 6. Finding missing numbers within a sequence. 7. Extending sequences – special sequences e.g Fibonacci.
	ALGEBRAIC NOTATION	1. Introduction to the concept and vocabulary of algebra and its relevance in real life. 2. Writing and interpreting simple algebraic expressions (e.g., 2x + 3, 4y - 5). 3. Simplify algebraic expressions, including adding, subtracting, multiplying and dividing terms. 4. Understand the difference between like and unlike terms. 5. Collecting like terms using positive terms. 6. Understand the concept of equivalence and recognise equivalent expressions. 7. Substitute values into algebraic expressions.
	PLACE VALUE AND ORDERING	1. Recognise the place value of any number in an integer up to one billion. 2. Understand and write integers to one billion in words and figures. 3. Work out intervals and position numbers on a number line. 4. Round integers to the nearest power of ten. 5. Compare two numbers using =, ≠, <, >, ≤, ≥ and order a list of integers 6. Find the range of the set of numbers and median of a set of numbers. 7. Understand place value for decimals. 8. Position decimals on a number line and order a list of decimals. 9. Round a number to 1 significant figure (stretch by rounding to 2 and 3 SF). 10. Write 10, 100, 1000 etc as powers of ten.
	EQUALITY AND EQUIVALENCE	1. Understand the concept of equality and recap inequality symbols. 2. Solve basic one-step equations using balancing method and inverse operations. 3. Solve two-step equations using balancing method and inverse operations. 4. CHALLENGE: Solving equations with variables on both sides.

KS3: Mathematics Scheme of Work

HT2		5. Define mathematical equivalence and recognise equivalent expressions by simplifying expressions.
	FRACTION, DECIMAL, AND PERCENTAGE EQUIVALENCE	1. Understand what a fraction is. (Identify parts of a fraction e.g. numerator and denominator). 2. Find equivalent fractions and simplify fractions to their simplest form. 3. Understand the relationship between decimals and fractions and convert between them. 4. Understand the relationship between decimals and percentages and convert between them. 5. Practice converting between all three forms. (Worded problems involving FDP equivalence).
	PROBLEM SOLVING WITH ADDITION AND SUBTRACTION	1. Properties of addition and subtraction. (Associative and Commutative) 2. Develop mental addition and subtraction methods. 3. Formal methods for integer addition and subtraction e.g. column addition. 4. Formal method for decimal addition and subtraction. 5. Solve real-life problems e.g. money problems, travel timetables.
HT3	FRACTIONS AND PERCENTAGES OF AMOUNTS	1. Find a fraction of a given amount using written methods. 2. Find a fraction of a given amount using a calculator. 3. Find a percentage of a given amount using a written method. 4. Find a percentage of a given amount using a calculator. 5. Solve problems with improper fractions and percentages greater than 100%.
	DIRECTED NUMBER	1. Understand what is meant by directed numbers. 2. Order directed numbers using number lines and appropriate symbols. 3. Add and subtract directed numbers. 4. Multiply and divide directed numbers. 5. Use a calculator for directed number calculations. 6. Order of operations with directed numbers. 7. Solve equations using directed numbers. 8. Understand that positive numbers have more than one square root (H) 9. Explore higher powers and roots (H)
HT4	ADDITION AND SUBTRACTION OF FRACTIONS	1. Understand representations of fractions. 2. Convert between mixed numbers and improper fractions. 3. Add and subtract fractions with same denominator. 4. Add and subtract fractions from integers. 5. Understand and use equivalent fractions. 6. Add and subtract fractions with share common denominator. 7. Add and subtract fractions with any denominators. 8. Add and subtract improper and mixed numbers. 9. Use fractions in algebraic context. 10. Use equivalence to add and subtract decimals and fractions.

		11. Add and subtract simple algebraic fractions (H).
	PYTHAGORAS' THEOREM	1. Introduction of Pythagoras' Theorem, $a^2 + b^2 = c^2$. 2. Understand that the hypotenuse is the longest side in a right-angled triangle, and label right-angled triangles with different orientations. 3. Use Pythagoras' Theorem to find the length of the hypotenuse. 4. Use Pythagoras' Theorem to find the length of the shorter sides. 5. Challenge: Use Pythagoras' Theorem to solve area problems.
HT5	CONSTRUCTING, MEASURING AND USING GEOMETRIC NOTATION	1. Understand angles as a measure of a turn. 2. Classify angles. 3. Draw and measure angles up to 180°. 4. Draw and measure angles between 180° and 360°. 5. Identify perpendicular and parallel lines. 6. Recognise types of triangles. 7. Recognise types of quadrilaterals. 8. Identify polygons up to a decagon. 9. Construct trianlges using SSS, SAS, and ASA. 10. Construct more complex polygons. 11. Interpret pie charts using a protractor. 12. Draw simple pie charts (60°, 90°, 180° and 270°). 13. Draw any pie chart.
	DEVELOPING NUMBER SENSE	1. Know and use mental addition and subtraction for integers. 2. Know and use mental multiplication and division. 3. Know and use mental arithmetic strategies for decimals. 4. Know and use mental arithmetic strategies for fractions. 5. Use factors to simplify calculations. 6. Use estimation as a method for checking mental calculations. 7. Use known number facts to derive other facts. 8. Know when to use a mental strategy or a formal written method. 9. Use known algebraic facts to derive other facts.
	SETS AND PROBABILITY	1. Identify and represent sets. 2. Interpret and create Venn diagrams. 3. Understand and use the intersection of sets. 4. Understand and use the union of sets. 5. Understand and use the complement of a set (H) 6. Know a use the vocabulary of probability.

HT6		7. Understand and use the probability scale. 8. Calculate the probability of a single event. 9. Know the sum of probabilities of all outcomes is 1. 10. Generate sample space diagrams.
	DEVELOPING GEOMETRIC REASONING	1. Understand and use the sum of angles on a straight line. 2. Understand and use the sum of angles around a point. 3. Understand and use the equality of vertically opposite angles. 4. Solve angle problems using properties of triangles and quadrilaterals. 5. Solve complex angle problems. 6. Investigate angles in parallel lines. 7. Understand and use parallel line angles rules. 8. Find and use the angle sum of any polygon. 9. Use known facts to obtain simple proofs.
	Cumulative Assessments every Half Term covering all topics.	All assessments have a revision lesson, an assessment lesson and a review lesson

ARNOLD LODGE
4 - 18 yrs Co-educational Independent Day School

KS3: Mathematics Curriculum Map

Year 8 Mathematics

The year 8 curriculum is taught in the order shown below.

	Topic	What is covered?
HT1	PRIME NUMBERS AND PROOF	1. Find factors and multiples of a given number. 2. Recognise and recall prime numbers. 3. Find the Highest Common Factor from a list. 4. Find the Lowest Common Multiple from a list. 5. Write a number as a product of its prime factors. 6. Use product of primes and Venn diagrams to find the HCF of two numbers. 7. Use product of primes and Venn diagrams to find the LCM of two numbers.
	RATIO AND SCALE	1. Simplifying ratios. 2. Expressing ratios as fractions. 3. Expressing ratios in the form 1: n. 4. Dividing a value into a given ratio. 5. Solving problems with ratio. 1. Applying ratios to gradients.
	MULTIPLYING AND DIVIDING FRACTIONS	1. Convert between mixed numbers and improper fractions. 2. Multiply a fraction by an integer. 3. Multiply unit fractions. 4. Multiply mixed fractions. 5. Understand and use reciprocals. 6. Divide an integer by a fraction. 7. Divide unit fractions. 8. Divide mixed numbers.
	MULTIPLICATIVE CHANGE	1. Solve problems using direct proportion. 2. Use conversion graphs. 3. Convert between currencies. 4. Interpret scales and maps using ratios. 5. Draw and interpret scale diagrams.

ARNOLD LODGE
4 - 18 yrs Co-educational Independent Day School

KS3: Mathematics Curriculum Map

HT2	SEQUENCES	1. Generate sequences given a rule in words. 2. Generate sequences given a simple algebraic rule. 3. Generate sequences given a complex algebraic rule. 4. Find the rule for the nth term of a linear sequences.
	WORKING IN THE CARTESIAN PLANE	1. Work with co-ordinates in all four quadrants. 2. Identify and draw lines that are parallel to the axes. 3. Recognise and use the line y=x. 4. Recognise and use lines of the form y=kx. 5. Recognise and use lines of the form y=x+a. 6. Plot graphs of the form y=mx+c. 7. Explore the gradient of the line y-=mx+c. 8. Explore non-linear graphs. 9. Find the midpoint of a line segment.
	BRACKETS AND SOLVING EQUATIONS	1. Form algebraic expressions. 2. Use directed numbers with algebra. 3. Multiply out a single bracket. 4. Factorise into a single bracket. 5. Expand multiple brackets and simplify. 6. Solve equations, including with brackets. 7. Form and solve questions with brackets. 8. Expand a pair of binomials. 9. Solve equations with unknowns on both sides. 10. Form and solve equations with unknowns on both sides.
HT3	REPRESENTING DATA	1. Draw and interpret scatter graphs. 2. Draw and use line of best fit in scatter graphs. 3. Understand and describe linear correlation. 4. Read and interpret ungrouped frequency tables. 5. Read and interpret grouped frequency tables. 6. Identify non-linear relationships. 7. Represent data in two-way tables.
	INDICES	1. Adding and subtracting expressions with indices. 2. Simplifying algebraic expressions by multiplying indices. 3. Simplifying algebraic expressions by dividing indices. 4. Using the addition law for indices. 5. Using the subtraction law for indices. 6. Explore powers of powers.

KS3: Mathematics Curriculum Map

	TABLES AND PROBABILITY	1. Recap finding single event probabilities. 2. Find probabilities from two-way tables. 3. Find probabilities from Venn diagrams. 4. Construct sample space diagrams for 1 or more events. 5. Find the probabilities from a sample space diagram. 6. Use the product rule for finding the total number of possible outcomes.
HT4	FRACTIONS AND PERCENTAGES	1. Convert fluently between fractions, decimals, and percentages. 2. Calculate fractions, decimals, and percentages of an amount without a calculator. 3. Calculate fractions decimal and percentages of an amount using calculator methods. 4. Convert between any decimals and percentages less than 100%. 5. Calculate percentage increase and decrease using a multiplier. 6. Express one number as a fraction or a percentage of another using calculator methods. 7. Work with percentage change. 8. Choose appropriate methods to solve percentage problems. 9. Find the original amount given the percentage is less than 100%. 10. Find the original amount given the percentage is greater than 100%.
	STANDARD INDEX FORM	1. Investigate positive powers of 10. 2. Work with numbers greater than 1 in standard form. 3. Investigate negative powers of 10. 4. Work with numbers between 0 and 1 in standard form. 5. Compare and order numbers in standard form. 6. Add and subtract numbers in standard form. 7. Multiply and divide numbers in standard form. 8. Understand and use of negative indices. 9. Understand and use fractional indices.
	NUMBER SENSE	1. Round numbers to powers of 10 and 1sf (recap) 2. Calculate using order or operations (recap) 3. Round numbers to a given number of decimal places. 4. Estimate the answer to a calculation. 5. Calculate with money. 6. Convert metric measures of length. 7. Convert metric units of weight and capacity. 8. Solve problems involving time and the calendar. 9. Understand and use error interval notation. 10. Convert metric units of area. 11. Convert metric units of volume.

KS3: Mathematics Curriculum Map

HT5	ANGLES IN PARALLEL LINES AND POLYGONS	1. Understand and use basic angle rules. 2. Investigate angles between parallel lines and the transversal. 3. Calculate with alternate and corresponding angles. 4. Calculate with co-interior angles. 5. Solve complex problems with parallel line angles. 6. Investigate the properties of special quadrilaterals. 7. Identify and calculate with sides and angles in quadrilaterals. 8. Calculate missing interior angles in regular polygons. 9. Understand and use the sum of exterior angles of any polygon. 10. Prove simple geometric facts.
	THE DATA HANDLING CYCLE	1. Find mean, median, mode and range of a set of small data. 2. Compare data using mean and range. 3. Draw and interpret pictograms, bar charts and vertical line charts. 4. Draw and interpret pie charts. 5. Draw and interpret line graphs. 6. Choose the most appropriate diagram for the given set of data. 7. Represent and interpret grouped quantitative data. 8. Compare distributions using charts. 9. Identify misleading graphs.
	AREA OF TRAPEZIA AND CIRCLES	1. Calculate the area of triangles, rectangles and parallelograms. 2. Calculate the perimeter and area of compound shapes. 3. Calculate the area of a trapezium. 4. Calculate the area of circles and parts of circles with calculator. 5. Calculate the area of a circle and parts of circles without a calculator.
HT6	MEASURES OF LOCATION	1. Understand and use the mean, median and mode (recap lesson). 2. Identify outliers. 3. Choose the most appropriate average and compare distributions using averages and range. 4. Find the mean from an ungrouped frequency table. 5. Find the mean from a grouped frequency table.
	LINE SYMMETRY AND REFLECTION	1. Recognise lines of symmetry. 2. Reflect a shape in a horizontal or vertical line. 3. Reflect a shape in a diagonal line. 4. Recognise invariant points.

KS3: Mathematics Curriculum Map

	Cumulative Assessments every Half Term covering all topics.	All assessments have a revision lesson, an assessment lesson, and a review lesson

ARNOLD LODGE
4 - 18 yrs Co-educational Independent Day School

KS3: Mathematics Curriculum Map

Year 9 Mathematics

Foundation – Red
Crossover – Green
Higher – Blue

The year 9 curriculum is taught in the order shown below.

	Topic	What is covered?
HT1	NUMBER SKILLS	1. Order and compare numbers by understanding the place value for integers and decimals. 2. Multiply and divide by powers of 10. 3. Apply order of operations with positive and negative integers. 4. Find multiples and factors of a given number. 5. Find the LCM and HCF of a set of numbers. 6. List and define prime numbers. 7. Perform prime factor decomposition of a given number. 8. Use prime factor decomposition to find the HCF or LCM of two numbers. 9. Product rule for counting
	EQUATIONS AND INEQUALITIES	1. Solving one and two-step linear equations with positive solutions 2. Solving two-step linear equations with negative and decimal/fractional solutions 3. Constructing and solving simple linear equations. 4. Solving equations linked with area and perimeter of shapes. 5. Solving linear equations with variables on both sides and equations involving brackets/fractions. 6. Solving linear inequalities and representing the solution on a number line. 7. Representing the solution of a single linear inequality of two variables on a graph. 8. Solve linear simultaneous equations in two variables – elimination. 9. Solve linear simultaneous equations in two variables – substitution.
	POWERS, ROOTS AND STANDARD FORM	1. Understand how to use a calculator fluently. 2. Simplify an expression using repeated multiplication. 3. Calculate integer power and roots. 4. Use index laws for multiplication and division of integer powers. 5. Calculate with fractional indices. 6. Calculate with negative indices. 7. Solve complex indices problems to find the value of k.

KS3: Mathematics Curriculum Map

HT2	ROUNDING	1. Round to the nearest power of ten and whole numbers. 2. Round to a given number of decimal places. 3. Round to a given number of significant figures. 4. Use round to significant figures to estimate calculations. 5. Understand the concept of bounds to find maximum and minimum values. 6. Use inequality notation to specify error intervals. 7. Calculate upper and lower bounds in simple problems. 8. Calculate upper and lower bounds in complex problems.
	AREA AND PERIMETER	1. Convert between metric units of measure. 2. Find the perimeter of common shapes. 3. Find the perimeter of compound shapes. 4. Understand area is a measure of 2D space. 5. Calculate the area of rectangles and triangles. 6. Calculate the area of parallelograms and trapeziums. 7. Calculate the area of compound shapes. 8. Solve problems when area or perimeter is given. 9. Calculate the surface area of prisms. 10. Convert metric measures of areas. 11. Find maximum and minimum areas using bounds.
	ANGLES AND BEARINGS	1. Apply the sums of angles at a point, on a straight line and in a triangle. 2. Solve angle problems using the standard angle facts. 3. Find unknown angles in a triangle and quadrilateral. 4. Find missing angles in special types of triangles. 5. Use alternate, corresponding and co-interior angles to find missing angles on parallel lines. 6. Find unknown interior angles in any regular or irregular polygon. 7. Find the exterior angles of any regular or irregular polygon. 8. Find the number pf sides of a regular polygon using its interior or exterior angle size.7Contruct and measure bearings on diagrams. 9. Find bearings from B to A, when given the bearings A to B.
	EXPANDING AND SIMPLIFYING LINEAR AND QUADRATIC EXPRESSIONS	1. Simplify expressions by collecting like terms. 2. Substitute integers into expressions and formulae. 3. Simplifying expressions involving multiplication and division. 4. Multiply a single term over a single bracket. 5. Expanding and simplifying multiple single brackets. 6. Expanding the product of two binomials. 7. Expanding the product of two or more binomials (H). 8. Factorise linear expressions into single brackets.

KS3: Mathematics Curriculum Map

HT3		9. Factorise quadratic expressions of the form $x^2 + bx + c$, including the difference of two squares. 10. Solve quadratic equations by factorising. 11. Solve quadratic equations using the quadratic formula. 12. Complete the square on an algebraic expression. 13. Solve quadratic equations by completing the square.
	PYTHAGORAS' THEOREM	1. Introduction of Pythagoras' Theorem, $a^2 + b^2 = c^2$. 2. Understand that the hypotenuse is the longest side in a right-angled triangle. 3. Use Pythagoras' Theorem to find the length of the hypotenuse. 4. Use Pythagoras' Theorem to find the length of the shorter sides. 5. Use Pythagoras' Theorem to solve problems involving 2D shapes. 6. Find the distance between points on a coordinate plane using Pythagoras' Theorem. 7. Use Pythagoras' Theorem to solve problems involving 3D shapes. 8. Solve problems related to volume and surface area.
	FRACTIONS	1. Convert between a mixed number and an improper fraction. 2. Add and subtract fractions with different denominators. 3. Multiply and divide fractions and integers. 4. Multiply and divide fractions including improper fractions and mixed numbers. 5. Find equivalent fractions, decimals, and percentages. 6. Compare fractions, decimals, and percentages. 7. Change recurring decimals into fractions and vice versa.
HT4	GRAPHS 1	1. Find the midpoint of two points. 2. Use a table of values to plot graphs of linear functions. 3. Identify the equations of horizontal and vertical graphs. 4. Use the form $y = mx + c$ to interpret graphs. 5. Identify the gradient and y-intercept of a linear graph from the equation and the graph. 6. Identify the equation of linear graphs from the graph. 7. Identify and interpret the gradient and y-intercept from $ax + by = c$. 8. Plot and sketch graphs in the format $ax + by = c$. 9. Use the form $y = mx + c$ to identify parallel lines. 10. Use the form $y = mx + c$ to identify perpendicular lines. 11. Find the equation of a line when given the gradient (or parallel line) and a point. 12. Find the equation of a straight line through two given points. 13. Solve simultaneous equations graphically.
	SEQUENCES	1. Continue a sequence and find missing terms within a sequence. 2. Find the term-to-term rule of a sequence. 3. Find the next term of a diagrammatic sequence. 4. Find the nth term of a linear sequence.

KS3: Mathematics Curriculum Map

		5. Use the nth term of a linear sequence to solve problems. 6. Find the nth term of a linear diagrammatic sequence. 7. Find the nth term of any quadratic sequence. 8. Find the nth term of a diagrammatic quadratic sequence. 9. Find and use the nth term of geometric sequences.
HT5	PROBABILITY	1. Place theoretical probabilities accurately on the probability scale. 2. Find probabilities based on equally likely outcomes. 3. Apply the property that the probabilities of mutually exclusive outcomes sum to 1. 4. Complete sample space diagrams for combined events with equally likely outcomes and calculate probabilities. 5. Calculate probabilities from two-way tables. 6. Calculate conditional probabilities from a two-way table. 7. Reverse a given probability to find possible outcomes. 8. Interpret the frequency of outcomes from tables and find their relative frequency. 9. Calculate expected outcomes of future experiments by applying relative frequency. 10. Read and draw basic Venn diagrams. 11. Complete Venn diagrams, including when the intersection needs to be calculated. 12. Find probabilities from a Venn diagram. 13. Find conditional probabilities from a Venn diagram.
	TRIGONOMETRY	1. Use trigonometric ratios to find missing lengths in right-angled triangles. 2. Use trigonometric to find missing angles in right-angled triangles. 3. Identify when to use Pythagoras' Theorem or trigonometric ratios. 4. Know and use exact values of sin θ and cos θ for θ = 0°, 30°, 45°, 60° and 90°, and tan θ for θ = 0°, 30°, 45°, 60°. 5. Apply the trigonometric ratios to solve 3D problems. 6. Apply the sine rule to find missing lengths and angles. 7. Apply the cosine rule to find missing lengths and angles. 8. Identify when to use Pythagoras' Theorem, trigonometric ratios, and the sine/cosine rule. 9. Solve problems using both sine and cosine rules to find unknown lengths and angles. 10. Solve bearing problems using advanced trigonometry. 11. Apply the formula A = ½absinC to calculate the area of a triangle. 12. Apply the formula A = ½absinC to calculate the area of a segment. 13. Apply the formula A = ½absinC to calculate the sides of a triangle.
HT6	PERCENTAGES I	1. Find equivalent fractions, decimals, and percentages. 2. Compare and order fractions, decimals, and percentages. 3. Find a simple percentage of a quantity (10%, 25%, 50% and 100%). 4. Find and integer percentage of a quantity. 5. Find an integer percentage of a quantity.

		6. Perform percentage increase or decrease with and without a calculator. 7. Solve a percentage change problem given in context. 8. Identify and work with fractions and percentages in context. 9. Find percentage change with multipliers.
	Cumulative Assessments every Half Term covering all topics.	All assessments have a revision lesson, an assessment lesson and a review lesson