SUNNYDOWN SCHOOL
MATHEMATICS CURRICULUM PLAN

Subject	Mathematics (KS4)	Year group	Y11 PW1
Subject Intent	In Pathway 1 Y11 students will be reinforcing all topics taught and learnt in Y10, by promoting solving problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps. Our intention is to consolidate learning in Y10 by exposing them to exam style questions and techniques. There will be opportunities for both extension activities and bespoke support where needed. We take into consideration the particular needs of our students and encourage them to feel confident with the fundamental mathematical concepts they will need to make them numerate and competitive in an increasingly demanding world. Teaching will enable students to know more and remember more in areas including: calculating, using the number system, accuracy, algebra, fraction, properties of shapes, percentages, sequences, ratio and proportion, units and scales, measuring shapes, number properties, functionals and graphs, constructions, transformations.		

Term	Topic	Core learning	Key concepts	Sequencing
Autumn 1	Calculating	- Add and subtract whole numbers - Multiply whole numbers - Add and subtract decimals - Divide whole numbers - Add and subtract negative numbers - Multiply and divide negative numbers	- Apply addition, subtraction, multiplication and division, including formal written methods, to positive and negative integers - Use addition and subtraction, including formal written methods, applied to decimals	**Building on…..** Students ability to calculate with the four operations taught in Y7 Autumn 1. Also building on students ability to use a calculator, which is taught in every topic where a calculator may be relevant. As well as checking the use of the bus stop method. **Building towards…** Including more complex notation to use in calculations, especially brackets and roots and powers and a

				combination of all of them seen in order of operations questions.
	Using the number system	• Using whole numbers • Understanding decimals • Multiplying and dividing by powers • Negative numbers	• Apply multiplication, including formal written methods, to decimals • Apply division, including formal written methods, to decimals • Understand and use place value for integers and decimals of any size • Order positive and negative integers and decimals • Use the symbols =, ≠, <, >, ≤, ≥ • Use the number line as a model for ordering of the real numbers • Order positive and negative integers	**Building on…..** Taking students basic knowledge of notation, including less than, greater than and equal to and checking they are able to implement this. As well as their ability to multiply and divide by powers of 10. Taught in Y7 Autumn 2. **Building towards…** Converting numbers to and from standard form and basic calculating with standard form focussing on multiplying and dividing.
	Accuracy	• Rounding. to the nearest 10, 100 • Rounding large numbers • Rounding decimals to the nearest integer • Rounding to 2 decimal places	• Rounding. to the nearest 10, 100; Rounding large numbers; Rounding decimals to the nearest integer; Rounding to 2 decimal places • Round numbers and measures to an appropriate degree of accuracy, including nearest whole number, power of ten and number of decimal places	**Building on…..** Students' ability to round to various degrees of accuracy. E.g. 1-3 d.p. And 1-3 as taught in Y7 Autumn 2. **Building towards…** Rounding to significant figures and some contextual problems.
Autumn 2	Starting algebra	• Making and using word formulae • Using letters • Combining variables	• Substitute numerical values into formulae and expressions, including scientific formulae • Understand and use the concept and	**Building on…..** Understanding algebraic terminology and students ability to collect like terms and multiply various terms

		• Working with formulae • Setting up and solving simple equations • Using brackets	vocabulary of terms, expressions, factors, equations and formulae • Understand and use standard mathematical formulae • Rearrange formulae to change the subject • Use and interpret algebraic manipulation including: • ab in place of $a \times b$ • $3y$ in place of $y + y + y$ and $3 \times y$ • $a{^\wedge}2$ in place of $a \times a$, • $a2b$ in place of $a \times a \times b$ • a in place of $a \div b$ • coefficients written as fractions rather than decimals brackets • Recognise and use relationships between operations, including inverse operations • Solve linear equations in one unknown algebraically • Simplify and manipulate algebraic expressions by: • collecting like terms • simplifying expressions involving sums, products and powers • multiplying a single term over a bracket • taking out common factors	taught in Y9 Autumn 2. Also building on students ability to take a sentence expressing something that can then be formed into either an expression or equation taught in Y7 Summer 2. **Building towards…** Rearranging basic to complex formulae, solving complex equations involving combinations of BIDMAS and simplifying expressions using laws of Indices.
	Fractions	• Understanding fractions • Finding equivalent fractions • Multiplying fractions • Adding and subtracting fractions	• Express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1 • Order positive and negative fractions; use the symbols =, ≠, <, > • Apply addition, subtraction and	**Building on…..** Students ability to simplify and find equivalent fractions. To apply four operations to fractions and order them using equa/not equal and less than/greater than symbols. Taught

			multiplication, including formal written methods, to simple fractions • Interpret fractions as operators	in Y9/Y8 Spring 1 and Y7 Autumn 2. **Building towards…** Converting improper fractions to mixed numbers and vice versa, Applying four operations to mixed numbers with focus on multiplication and division.
	Properties of shapes	• Line symmetry/rotational symmetry • Angle facts & notation • Angles in triangles and quadrilaterals • Types of quadrilaterals • Circle properties	• Use the reflection and rotational symmetry properties of polygons • Apply the properties of angles at a point, angles at a point on a straight line, vertically opposite angles • Draw diagrams from written descriptions • Measure line segments and angles in geometric figures • Use the standard conventions for labelling and referring to the sides and angles of triangles • Derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in a quadrilateral) • Identify, describe and construct congruent shapes • Use conventional terms and notations: vertices, edges, parallel lines, perpendicular lines, right angles, polygons, regular polygons • Derive and apply the properties and definitions of special types of quadrilaterals, including: square,	**Building on…..** Understanding of basic angle facts and notation, such as the notation used to identify angles (∠ABC) and how to find them. Understanding of properties of a circle. Taught in Y7 Spring 2. **Building towards…** Ability to find missing angles in parallel lines and polygons, recalling angle facts to use as proof and formulae.

			rectangle, parallelogram, trapezium, kite and rhombus; and triangles and other plane figures using appropriate language • Identify circle definitions and properties, including: centre, radius, chord, diameter and circumference	
Spring 1	Percentages	• Understanding and using % • Calculating % of quantities • Convert fractions and decimals to %	• Define percentage as 'number of parts per hundred' • Express one quantity as a percentage of another • Compare two quantities using percentages • Interpret percentages as operators • Order decimals and fractions • Work interchangeably with terminating decimals and their corresponding fractions • Interpret percentages as a fraction or a decimal, interpret these multiplicatively	**Building on…..** Students ability to multiply and divide by powers of 10 (10, 100, 1000) etc. Taught in Y7 Autumn 2. Students ability to simplify, find equivalent and order fractions. Taught in Y9 Spring 1. **Building towards…** Applying percentage in problem solving questions, finding percentage of amounts both non-calculator and calculator.
	Sequences	● What is a sequence? ● Generating sequences	What is a sequence?/Generating sequences • Use various forms of a sequence to define and show progression of numbers and values. • Generate terms of a sequence from a term-to-term rule or a position-to-term rule	**Building on…..** Students ability to recognise patterns in visual and number sequences, including finding missing patterns/numbers and some exploration of the nth term of linear sequences. Taught in Y9 Autumn 2. **Building towards…** Finding the nth term of increasing and decreasing linear sequences and

				finding next terms of quadratic and Fibonacci sequences.
	Ratio and proportion	• Understanding ratio notation	• Use ratio notation, including reduction to simplest form • Relate ratios to fractions	**Building on.....** Students ability to interpret the notation and meaning of ratios. Students' ability to simplify ratios and share a value amongst a given ratio. Taught in Y8 Summer 1 and Y9 Summer 2. **Building towards...** Reinforcing ability to share a value amongst a ratio and applying this to problems given in a context.
Spring 2	Units and scales	• Length • Mass • Time • Volume • The metric system • Metric and imperial conversions • Interpreting scales • Bearings	• Use standard units of measure for length, mass, volume and capacity, and related concepts using decimal quantities where appropriate • Change freely between related standard units in numerical contexts • Use scale diagrams and maps • Interpret maps and scale drawings and use bearings • Measure line segments and angles in geometric figures	**Building on.....** Students' ability to convert between units of length, mass and time. Taught in Y7 Spring 2. **Building towards...** Ability to find and apply bearings in problems, read maps and create plans using a scale. Finding missing compound units using speed, distance and time as well as density, mass and volume.

	Measuring shapes	● Understanding area ● Finding area and perimeter ● Circumference	● Use standard units of measure for length and area, and related concepts ● Know and apply formula to calculate: area of triangles, parallelograms, trapezia ● Calculate perimeters of 2D shapes ● Identify and apply circle definitions and properties, including: centre, radii, diameter and circumference ● Know the formulae: circumference of a circle = $2\pi r = \pi d$ ● Calculate perimeters of 2D shapes, including circles	**Building on…..** Students ability to find area and perimeter of regular polygons. Taught in Y9 Autumn 1. Students' ability to find the circumference of circles. Taught in Y9 Autumn 1. **Building towards…** Finding the area of circles. Learning Pythagoras theorem and its application in triangles.
	Number properties	● Multiples ● Factors, primes and powers, divisibility tests ● Index notation ● Prime factorisation	● Recognise and use relationships between operations ● Use the concepts and vocabulary of prime numbers, multiples and factors (divisors) ● Use positive integer powers and associated real roots ● Use positive integer powers and associated real roots (square, cube and higher) ● Recognise powers of 2, 3, 4, 5 ● • Calculate with positive Integer indices	**Building on…..** Students ability to recall factors and multiples of numbers. Students' ability to recall prime numbers. Students' ability to recognise roots and powers of positive integers. All taught in Y7, 8 and 9 Spring 2. **Building towards…** Prime factorisation and its applications, including using products of primes to find the HCF/LCM. Learning the basic laws of indices.
Summer 1	Functions and Graphs	● Real-life graphs ● Plotting graphs of linear functions	● Plot and interpret graphs of non-standard functions in real contexts to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration	**Building on…..** Students ability to build scales on x-axis and y-axis. Evenly space them out with even distribution. Understanding the direct relationships between two variables

			• Work with coordinates in all four quadrants • Plot graphs of equations that correspond to straight-line graphs in the coordinate plane • Find approximate solutions to linear equations using a graph • Where appropriate, interpret simple expressions as functions with inputs and outputs	and being familiar with variables that are commonly plotted on graphs. (E.g. distance and time, speed and time etc). Taught in Y9 Summer 1. **Building towards…** Interpreting information from real-life graphs, plotting linear graphs using equations.
	Constructions	Grades 1 - 3 (Essential topics) ● Construction with a ruler and protractor	Construction with a ruler and protractor • Measure line segments and angles in geometric figures • Identify and construct congruent shapes	**Building on…..** Basic constructions using ruler and protractor, meaning drawing 2D shapes accurately using angles and lengths with a protractor and ruler. Taught in Y8 Spring 2. **Building towards…** Using a ruler and protractor to identify and construct congruent shapes, particularly triangles as well as some common constructions using a compass.
	Transformations	● Position and cartesian co-ordinates ● Cartesian co-ordinates in 4 quadrants ● Translation,	• Solve geometric problems on coordinate axes Cartesian co-ordinates in 4 quadrants • Use conventional terms and notations: points, lines • Identify, describe and construct congruent and similar shapes, including on coordinate axes by considering rotation,	**Building on…..** Understanding on how to work with Cartesian coordinates in all four quadrants. Working with all four transformations. Taught in Y9 Autumn 2.

| | | Reflection, Rotation, Enlargement | reflection, translation and enlargement (including fractional scale factors)
 • Describe translations as 2D vectors
 • Use scale factors
 • Compare lengths and areas
 • Make links to scale factors | **Building towards…**
 Reinforcing ability to transform shapes on a graph and identifying similarity between shapes and |