



SUNNYDOWN SCHOOL

MATHEMATICS CURRICULUM PLAN

Subject	Mathematics (KS4)	Year group	10 Pathway 1
Subject Intent	<p>In Pathway 1, the intent is to build on what they have learnt in KS3, improve on it and ensure knowledge is not forgotten by revisiting that topic or skill through various ways, including quizzes, classwork, clarification of content and individual work. All students in PW1 will be entered for foundation level GCSE; being strong in the basics in maths is what will give them the confidence in their ability to manoeuvre towards their GCSE exams.</p> <p>They are taught a skill, how best to remember that skill, and given opportunities to practise that skill in both lessons, assessments and homework throughout the year. Some students will move past the task of repeatedly practising a skill and start to apply that skill to basic problem solving in a given context; this links back to differentiated Learning Objectives (LOs), part of the Sunnydown 4. LOs are split into 'All', 'Most' and 'Some', as in all, most or some will meet that learning objective.</p>		

Term	Topic	Core learning	Key concepts	Sequencing
Autumn 1	Calculating	<ul style="list-style-type: none"> Add and subtract whole numbers Multiply whole numbers Divide whole numbers Add and subtract decimals Add and subtract negative numbers Multiply and divide negative 	<ul style="list-style-type: none"> 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 	<p>Building on.....</p> <p>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.</p> <p>Building towards...</p>

		numbers		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.
Autumn 1	Using the number system	<ul style="list-style-type: none"> Using whole numbers Understanding decimals Multiplying and dividing by powers Negative numbers 	<ul style="list-style-type: none"> 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 	<p>Building on.....</p> <p>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.</p> <p>Building towards...</p> <p>Converting numbers to and from standard form and basic calculating with standard form focussing on multiplying and dividing.</p>
Autumn 1	Accuracy	<ul style="list-style-type: none"> Rounding. to the nearest 10, 100 Rounding large numbers Rounding decimals to the nearest integer Rounding to 2 decimal places 	<ul style="list-style-type: none"> 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 	<p>Building on.....</p> <p>Students' ability to round to various degrees of accuracy. E.g. 1-3 d.p. And 1-3 as taught in Y7 Autumn 2.</p> <p>Building towards...</p>

				Rounding to significant figures and some contextual problems.
Autumn 1	3D shapes	<ul style="list-style-type: none"> • Properties of 3D shapes • Understanding nets • Volume and surface area of cuboids • 2D representations of 3D shapes 	<ul style="list-style-type: none"> • Identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres • Use conventional terms and notations: vertices, edges, planes • Use standard units of measure and related concepts (length, area, volume) • Know and apply formula to calculate volumes of cuboids • Interpret plans and elevations of 3D shapes 	<p>Building on.....</p> <p>Properties of 3D shapes, defining a prism, volume/surface area of cuboids and nets of 3D shapes as taught in Y8 Autumn 1 and 2 and Y9 Autumn 1.</p> <p>Building towards...</p> <p>Finding volume of compound/composite 3D shapes and constructing plans and nets of simple 3D shapes.</p>
Autumn 2	Starting algebra	<ul style="list-style-type: none"> • Making and using word formulae • Using letters • Combining variables • Working with formulae • Setting up and solving simple equations • Using brackets 	<ul style="list-style-type: none"> • Substitute numerical values into formulae and expressions, including scientific formulae • Understand the use, concept and vocabulary of variables, 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^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 	<p>Building on.....</p> <p>Understanding algebraic terminology and students ability to collect like terms and multiply various terms 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.</p> <p>Building towards...</p> <p>Rearranging basic to complex formulae, solving complex equations involving combinations of BIDMAS and simplifying expressions using laws of Indices.</p>

			<p>between operations, including inverse operations</p> <ul style="list-style-type: none"> • Solve linear equations in one unknown algebraically • Simplify and manipulate algebraic expressions by: <ul style="list-style-type: none"> collecting like terms simplifying expressions involving sums, products and powers multiplying a single term over a bracket taking out common factors 	
Autumn 2	Fractions	<ul style="list-style-type: none"> • Understanding fractions • Finding equivalent fractions • Multiplying fractions • Adding and subtracting fractions 	<ul style="list-style-type: none"> • 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 =, \neq, $<$, $>$ • Apply addition, subtraction and multiplication, including formal written methods, to simple fractions • Interpret fractions as operators 	<p>Building on.....</p> <p>Students ability to simplify and find equivalent fractions. To apply four operations to fractions and order them using equal/not equal and less than/greater than symbols. Taught in Y9/Y8 Spring 1 and Y7 Autumn 2.</p> <p>Building towards...</p> <p>Converting improper fractions to mixed numbers and vice versa, Applying four operations to mixed numbers with focus on multiplication and division.</p>
Autumn 2	Properties of shapes	<ul style="list-style-type: none"> • Line symmetry/rotational symmetry • Angle facts & notation • Angles in triangles and 	<ul style="list-style-type: none"> • 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 	<p>Building on.....</p> <p>Understanding of basic angle facts and notation, such as the notation used to identify angles ($\angle ABC$) and how to find them. Understanding of properties of a circle. Taught in Y7 Spring 2.</p>

		<ul style="list-style-type: none"> • quadrilaterals • Types of quadrilaterals • Circle properties 	<p>geometric figures</p> <ul style="list-style-type: none"> • 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, 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 	<p>Building towards...</p> <p>Ability to find missing angles in parallel lines and polygons, recalling angle facts to use as proof and formulae.</p>
Spring 1	Percentages	<ul style="list-style-type: none"> • Understanding and using % • Calculating % of quantities • Convert fractions and decimals to % 	<ul style="list-style-type: none"> • 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 	<p>Building on.....</p> <p>Students ability to multiply and divide by powers of 10 (10, 100, 1000) etc. Taught in Y7 Autumn 2.</p> <p>Students ability to simplify, find equivalent and order fractions. Taught in Y9 Spring 1.</p> <p>Building towards...</p> <p>Finding percentage of amounts, percentage change, reverse percentage and compounded interest, both non-calculator and calculator.</p>

Spring 1	Sequences	<ul style="list-style-type: none"> • What is a sequence? • Generating sequences 	<p>What is a sequence?/Generating sequences</p> <ul style="list-style-type: none"> • 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 	<p>Building on.....</p> <p>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.</p> <p>Building towards...</p> <p>Finding the nth term of increasing and decreasing linear sequences and finding next terms of quadratic and Fibonacci sequences.</p>
Spring 1	Ratio and proportion	<ul style="list-style-type: none"> • Understanding ratio notation 	<ul style="list-style-type: none"> • Use ratio notation, including reduction to simplest form <p>Relate ratios to fractions</p>	<p>Building on.....</p> <p>Students ability to interpret the notation and meaning of ratios.</p> <p>Students' ability to simplify ratios and share a value amongst a given ratio.</p> <p>Taught in Y8 Summer 1 and Y9 Summer 2.</p> <p>Building towards...</p> <p>Reinforcing ability to share a value amongst a ratio and applying this to problems given in a context.</p>
Spring 2	Units and scales	<ul style="list-style-type: none"> • Length • Mass • Time 	<ul style="list-style-type: none"> • Use standard units of measure for length, mass, volume and capacity, and related concepts using decimal 	<p>Building on.....</p> <p>Students' ability to convert between units of length, mass and time. Taught in Y7</p>

		<ul style="list-style-type: none"> • Volume • The metric system • Metric and imperial conversions • Interpreting scales • Bearings 	<p>quantities where appropriate</p> <ul style="list-style-type: none"> • 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 	<p>Spring 2.</p> <p>Building towards...</p> <p>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.</p>
Spring 2	Measuring shapes	<ul style="list-style-type: none"> • Understanding area • Finding area and perimeter • Circumference 	<ul style="list-style-type: none"> • 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 	<p>Building on.....</p> <p>Students ability to find area and perimeter of regular polygons. Taught in Y9 Autumn 1.</p> <p>Students' ability to find the circumference of circles. Taught in Y9 Autumn 1.</p> <p>Building towards...</p> <p>Finding the area of circles.</p> <p>Learning Pythagoras theorem and its application in triangles.</p>
Spring 2	Number properties	<ul style="list-style-type: none"> • Multiples • Factors, primes and powers, divisibility tests 	<ul style="list-style-type: none"> • 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 	<p>Building on.....</p> <p>Students ability to recall factors and multiples of numbers.</p> <p>Students' ability to recall prime numbers.</p> <p>Students' ability to recognise roots and powers of positive integers. All taught in Y7, 8 and 9 Spring 2.</p> <p>Building towards...</p>

				Prime factorisation, index notation and learning the basic laws of indices.
Summer 1	Functions and Graphs	<ul style="list-style-type: none"> • Real-life graphs • Plotting graphs of linear functions 	<ul style="list-style-type: none"> • 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 • 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 	<p>Building on.....</p> <p>Students ability to build scales on x-axis and y-axis. Evenly space them out with even distribution.</p> <p>Understanding the direct relationships between two variables 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.</p> <p>Building towards...</p> <p>Plotting linear graphs using equations $y=mx+c$ and finding gradient of a line.</p>
Summer 1	Constructions	<ul style="list-style-type: none"> • Construction with a ruler and protractor 	<p>Construction with a ruler and protractor</p> <ul style="list-style-type: none"> • Measure line segments and angles in geometric figures • Identify and construct congruent shapes 	<p>Building on.....</p> <p>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.</p> <p>Building towards...</p> <p>Using a ruler and protractor to identify and construct congruent shapes, particularly triangles as well as some common constructions using a compass.</p>
Summer	Transformations	<ul style="list-style-type: none"> • Position and 	<ul style="list-style-type: none"> • Solve geometric problems on 	<p>Building on.....</p>

1	ons	<p>cartesian co-ordinates</p> <ul style="list-style-type: none"> • Cartesian co-ordinates in 4 quadrants • Translation, Reflection, Rotation, Enlargement 	<p>coordinate axes</p> <p>Cartesian co-ordinates in 4 quadrants</p> <ul style="list-style-type: none"> • Use conventional terms and notations: points, lines • Identify, describe and construct congruent and similar shapes, including on coordinate axes by considering rotation, 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 	<p>Understanding on how to work with Cartesian coordinates in all four quadrants. Working with all four transformations. Taught in Y9 Autumn 2.</p> <p>Building towards...</p> <p>Reinforcing ability to transform shapes on a graph and identifying similarity between shapes and congruency using triangle facts.</p>
Summer 2	Algebraic methods	<ul style="list-style-type: none"> • Linear inequalities 	<ul style="list-style-type: none"> • Understand and use the concepts and vocabulary of inequalities • Use the symbols $<$, $>$, \leq, \geq • Solve linear inequalities in one variable; represent the solution set on a number line 	<p>Building on.....</p> <p>Students' knowledge and understanding of mathematical symbols such as $<$ and $>$. Taught in Y9 Autumn 2.</p> <p>Building towards...</p> <p>Solving simple inequalities and representing these simple inequalities on a number line.</p>
Summer 2	Statistical measures	<ul style="list-style-type: none"> • Mode, median and range • Using mean, median, mode and range • Using frequency tables 	<ul style="list-style-type: none"> • Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode) and spread (range) 	<p>Building on.....</p> <p>Students' knowledge of four averages and their fundamental differences, uses in different applications and pros and cons of each as taught in Y7 Summer 1 and Y8 Summer 2.</p> <p>Also building on students ability to use a simple frequency table as taught in Y7 Spring 1.</p>

				<p>Building towards...</p> <p>Applying ability to find mean, median, mode and range to problems in a given context or extending the difficulty of finding averages. E.g. Find unknown variables given mean and all but one value.</p>
<p>Summer 2</p>	<p>Probability</p>	<ul style="list-style-type: none"> • Introduction to probability • Single event probability 	<ul style="list-style-type: none"> • Use appropriate language and the 0-1 probability scale • Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future events • Record, describe and analyse the frequency of outcomes of probability experiments using tables • Apply the property that the probabilities of an exhaustive set of outcomes sum to one • Construct theoretical possibility spaces for single experiments with equally likely outcomes and use these to calculate theoretical probabilities 	<p>Building on.....</p> <p>Using appropriate language in probability, and recording probability statistics using appropriate tools (tables, scales, words). As taught in Y7, Y8 and Y9 Spring 1.</p> <p>Building towards...</p> <p>Applying the multiplication rule and the addition rule (AND/OR rules) to find probabilities of combined and mutually exclusive events respectively. Finding probability using probability trees.</p>