SUNNYDOWN SCHOOL

MATHEMATICS CURRICULUM PLAN

Subject	Maths	Year group	Y9
Subject Intent	Like the Year 8 Maths curriculum, the Year 9 curriculum ensures Sunnydown students continue to revisit knowledge so we can further build these concepts to include more challenging reasoning and problem-solving skills. We aim to have a calm and safe learning environment with equality of opportunity for all students, promoting the development of inclusive learning opportunities. Mistakes are accepted and encouraged as a method for learning something new. Whilst a lot of the topics are repeated, we have the flexibility to move through topics at a pace that meets the needs of the students. For example, depending on the abilities of the class, we may speed up and cover two lessons in one, or we may need to spend longer on something that they are finding more challenging. This is the nature of Sunnydown. We will also broaden their depth of knowledge and challenge them to apply what they have learnt to exam style questions. This will challenge students as well as develop resilience and confidence before moving into Year 10 when they are split into pathways. During their last year of KS3, Year 9 students will cover all the fundamental skills that will be needed to be successful in KS4.		

Term	Topic	Core learning	Key concepts	Sequencing
Autumn 1	**Number** Four operations	Through this topic the pupils will be able to: ● Add and subtract 2 and 3 digit numbers using an efficient written method ● To count on and take away in 10's ● Use a number square/ line effectively ● Add and subtract whole and decimal numbers using an efficient written method ● Multiply and divide integers using efficient written methods like long multiplication, repeated addition and Napier's bones ● Multiply and divide whole and decimal numbers using efficient written methods ● Make the links between +,- and x,÷ explicit ● Encourage use of mental calculations and strong number bonds	Adding, subtracting, dividing and multiplying in a variety of different contexts.	Building on number work from KS2 and KS3 so far, making sure the key concepts that appear in all areas of maths are solidified. Building towards applying addition, subtraction, multiplication and division knowledge and skills to all areas of the maths curriculum.

		• Emphasise the importance of knowing your times tables • Emphasise the importance of checking an answer using a quick estimation • Select from a range of checking methods, including estimating and inverse operations • Multiplying and dividing numbers by 10, 100, 1000 • Use BIDMAS accurately • Apply knowledge to real life situations		
	Geometry Area and Perimeter	Through this topic the pupils will be able to: • Count squares to find out the area of a shape • Use the formula for finding the area of squares, rectangles and parallelograms • Spot the perpendicular height of an object • Use the formula for finding the area of a triangle • Find the area of compound shapes. • Use the formula for finding the area of a circle. • Find the surface area of a 3d shape. • How to work out the perimeter of a shape by counting squares • How to use the information provided to work out the perimeter of a rectangle and compound shape • How to work out the Hypotenuse of a right-angle triangle and use this to work out the perimeter of a compound shape that includes right angled triangles. • Where Pi comes from and how to use it • How to use a formula to work out the circumference of a circle.	Understanding the difference between area and perimeter and how to calculate them on rectangles, parallelograms, trapeziums, triangles and circles.	Building on shape and measure learning from KS2 & KS3 so far. Rectangles and triangles should be secure from Y8. Building towards calculating the area and perimeter of any shape, problem solving in exam style questions.
Autumn 2	**Geometry** Volume	Through this topic the pupils will be able to: • Order everyday objects in order of volume • Estimate the volume of everyday containers • Count cubes to find the volume of simple 3D shapes • Use the formula Length x width x height to work out the volume of simple cubes and cuboids • Use the above formula when calculating the volume of more complicated shapes	Learning the formulas for calculating the volume of a variety of 3D prisms.	Building on area and perimeter learning from Autumn 1 - extending into 3D shapes. Building towards learning how to calculate the volume of more complex 3D shapes

		● Find the volume of prisms by finding the area of one of it's faces and x it by the length ● Understand the link between 1 cm^3 and 1 ml		(spheres, cones etc.)
	Geometry Transformations	Through this topic the pupils should: ● Identify symmetry by folding and using tracing paper ● Identify all of the lines of symmetry in a regular triangle, quad, pentagon, hexagon and octagon ● Reflect shapes drawn on dotty and squared paper ● Reflect shapes in horizontal, vertical and diagonal lines ● Reflect shapes that cross over the mirror line ● Identify the order of rotational symmetry in shapes and patterns ● Identify the planes of symmetry in 3D shapes ● Use a plane of symmetry to complete a 3D shape	Exploring symmetry in 2D and 3D shapes.	Building on shape and symmetry learning from KS2 and KS3. Making sure they have a solid understanding of reflection. Building towards understanding all translations through 4 quadrants later in the year and applying knowledge to problem solving.
	Algebra Number patterns, rules and formula	Through this topic pupils should: ● Be able to solve simple number patterns by finding a simple rule ● Be able to explain what is happening in the number pattern using words and numbers ● Use the number in the rule to work out a simple formula that will find any term in that sequence ● Be able to use knowledge of inverse operations to solve simple equations ● Simplify an expression by multiplying out of brackets ● Generate a quadratic sequence from term to term or position to term rules ● Solve equations with unknowns on both sides of the = sign ● Solve an equation by multiplying out of brackets ● Use an appropriate method to solve straight forward simultaneous equations ● Solve basic inequalities	Exploring the nth term, finding the nth term rule and writing a sequence from a given rule. Look at more complex algebra like expanding brackets, quadratic and simultaneous equations.	Building on number sequences that are learned in KS2 and KS3 so far. Building towards becoming more confident in algebra; solving equations with more than one unknown and expanding brackets.
Spring 1	**Number**	Through this topic the pupils will be able to:		Building on previous

	Fractions, decimals and percentages	● Find a simple fraction of an amount e.g. ½ of £80 and find more complicated fraction of an amount e.g. ¾ of £120 using written and calculator methods ● Use the a b/c button on the scientific calculators. ● Find equivalent fractions and simplify given fractions ● Change from mixed numbers into top heavy fractions and vice versa. ● Use the 4 operations with fractions. ● Understand the links between frac/dec/% ● Ordering decimal numbers ● +, - decimal numbers ● Multiply and divide simple decimal numbers ● Use estimation to check for reasonableness ● Convert between fractions, decimals and percentages ● Apply percentage increases and decreases	Fractions, decimals and percentages are all linked. The ability to change between them is key when problem solving.	learning on fractions, decimals and percentages. This topic is introduced in KS2 and Sunnydown students will have a wide range of knowledge depending on their previous learning experiences. As such we cover all prior learning depending on the needs of the class. Building towards confidently converting between fractions, decimals and percentages and applying knowledge to multistep problems.
	Probability	Through this topic the pupils will be able to: ● Place everyday experiences on a probability scale ● Use dice, cards, spinners and coins to work out the theoretical probability of certain outcomes ● Realise that probabilities can be shown using fractions/decimals/percentages and all of the outcomes always add up to 1 ● Remember how to cancel fractions in order to give fully simplify answers ● Design simple sample space diagrams to show all possible outcomes of an activity/ event ● Work out if a game is fair or if the equipment or rules are bias	Whilst we can use terms like 'impossible, likely, certain' to describe the chances of something happening, students will learn how to calculate a more accurate probability of something happening.	Building on prior knowledge of probability from KS2 and previous topic of fractions, decimals and percentages. Building towards applying knowledge to multistep problems.
Spring 2	**Geometry** Time	Through this topic the pupils will be able to: ● Understand time in analogue and digital ● Use 24 hour clock	Checking what knowledge they have of telling the time on	Building on prior knowledge of time from KS2 and KS3. It is taught explicitly in Y4 but

		● Apply knowledge to problem solving and real life skills such as timetables	analogue and digital and then applying to real life situations.	not a focus in UKS2 and in preparation for SATs. This means that there is often a range of levels of understanding and confidence with telling the time. The length of this topic will vary depending on the needs of each class. Building towards applying knowledge to real world problem solving in the context of cooking, travelling and independently organising themselves.
	Number Multiples, Factors, Primes	Through this topic the pupils should know how to: Square a number and find a number's square root realising that they are the opposite operations Quickly work out simple number bonds Use a variety of strategies to complete a multiplication square Use a multiplication square to multiply and divide Round numbers to the nearest whole, nearest 10 and 100 Use rounded numbers to work out difficult questions and check their answers to see if they are reasonable Use estimation strategies to answer a variety of real life mathematical problems	This unit is used to revisit basic operations from Autumn 1, going over and using the written methods to check mental strategies.	Building on basic operations learning from Autumn 1. Understanding of rounding and mental strategies to quickly estimate an answer. Building towards being able to apply knowledge to longer exam style questions.
	Algebra Trial and improvement	Through this topic the pupils should know how to: ● Use the trial and improvement method to solve simple linear equations ● Use the trial and improvement method to solve more complicated linear equations ● Use inverse principals to work through function machines ● Apply inverse methods to solve simple linear equations	This unit teaches the boys a lot about perseverance to go back and forth on a problem to find a solution.	Building on algebra from Autumn 2 and estimation from Spring 2 and prior knowledge of using a calculator. Building towards applying

				knowledge to longer style problem solving questions, especially using a calculator accurately.
Summer 1	**Geometry** Angles	Through this topic the pupils will be taught: ● Naming, estimating and measuring angles ● Drawing, calculating and labelling angles ● Calculating angles on a straight line and in a full turn ● Triangle properties and angles inside triangles ● Parallel line properties ● Quadrilateral properties ● Intersecting line properties ● Correctly identify the hypotenuse in a right angle triangle and begin to use Pythagoras to calculate it's length ● Apply knowledge of properties of angles to solve angle problems ● Calculate the interior angles of any regular polygon using an appropriate method ● Label the sides of a triangle with Hyp, Opp and adj and decide which trigonometric ratio is appropriate to calculate the size of an angle ● Label the sides of a triangle with Hyp, Opp and adj and decide which trigonometric ratio is appropriate to calculate the length of a side	Learn how to use a protractor accurately to measure and draw angles. Use knowledge to find missing angles.	Building on basic angle and line learning from KS2 and KS3. Make sure the types of angles are known and how to find the size of an angle. Building towards using trigonometry in preparation for GCSEs.
	Statistics	Through this topic the pupils should know how to: ● Collect data using a tally chart ● Design a survey and response boxes ● Write a prediction ● Display data in bar chart, line graph and pie chart ● Analyse data and write a conclusion ● Interpret graphs ● Know how to read a graph (along the corridor up the stairs etc.) ● Draw a linear graph from a table of values (negative and positive)	Look at a variety of different charts and graphs, go through how to read and draw them. We will also go through collecting data, writing a prediction and a conclusion.	Building on prior learning of charts and graphs from KS2 and KS3. Students will have a variety of experiences and levels of understanding. Building towards being able to accurately collect data and plot graphs in Maths and Science.

		● Produce a scatter graph and show the relationship between 2 variables ● Apply knowledge of statistics to display grouped data ● Use scatter diagrams to display appropriate data and describe correlation ● Generate a line of best fit from a scatter diagram to describe overall trends in the data ● Draw a box and whisker diagram from a cumulative frequency graph		
Summer 2	**Algebra** Coordinates & Straight line graphs	Through this topic the pupils should know how to: ● Understand and use coordinates in the first, second and third quadrants ● Understand and use coordinates in all four quadrants ● Draw a linear graph from a table of positive values ● Draw a linear graph from a table of negative values ● Draw a quadratic graph from a table of values ● Draw graphs of cubic functions	Understanding how to read and plot coordinates in four quadrants. Understanding the relationships between the x and y axis and how a table of values can be translated onto a coordinate grid.	Building on prior knowledge of coordinates and algebra from earlier in KS3 and KS2. . Building towards being able to apply algebra understanding into linear and quadratic graphs.
	Ratio	Through this topic the pupils should know how to: ● Sharing things into unequal parts ● Simplify ratio ● Showing ratio as words, decimals, percentages and fractions ● Understand and apply knowledge of scale factors and scale drawings on maps and diagrams to solve simple problems ● Share simple amounts using a ratio ● Understand and apply knowledge of scale factors and scale drawings on maps and diagrams to solve complex problems involving words and diagram ● Express a ratio in the form of a fraction ● Solve problems involving % change- increase and decrease ● Solve problems involving direct proportion ● Solve problems involving simple and compound interest	Understanding what ratio is, how to share amounts between ratios and solve problems. We also start to look at scale factors and maps this term.	Building on prior knowledge from KS2 and KS3. Building towards applying to problem solving - recognising when the question involves ratios.