The Acorns School

Overview plans for academic year 2023-2024

Subject: Mathematics **Year group/cohort: Year 10**

	Knowledge and Understanding	**Knowledge and Understanding**	**Skills**	**Skills**	**Assessment**	**Subject specific literacy**	**Cross curricular links**
	Components (Key concepts)	Composite (Bigger picture)	Components (Key concepts)	Composite (Bigger picture)	What is being assessed, how, and when?	Key Vocabulary	Including Personal Development and SMSC
Autumn	Perimeter and Area	Convert metric units to metric units Find the perimeter of basic 2D shapes Find the perimeter of compound shapes Find the area of 2D shapes; rectangle, triangle, a trapezium, parallelogram Calculate areas and perimeters of compound shapes made from triangles and rectangles Find the surface area of a prism Convert	Understand the relationship between metric units. Find the perimeter of 2d shapes. Find the area of 2d shapes. Break up compound shapes to be able to calculate area and perimeter and then combine the answer to accurately find the area and perimeter. Find the surface area of 2d shapes.	Apply the metric units. Find the area and perimeter of shapes by addition and multiplication. Find the best way to break up a compound shape to be able to work out the area and perimeter before combining the overall perimeter and area. Consider the different parts of the surface area in order to accurately	Converting metric units. Finding the perimeter of shapes including compound shapes. Finding the area of shapes including compound shapes. Finding the surface area of 3D shapes.	Area Perimeter Metric Compound	Construction, Joinery, Agriculture, manufacturing, property and surveying, boundaries

		between metric area measures.	Convert between metric area measures.	calculate the surface area. Understand the conversion when applying metric area.			
Autumn	Indices and Standard Form	Use index laws involving fractions Use numbers raised to the power zero Convert large and small numbers into standard form and vice versa Add, subtract, multiply and divide numbers in standard form Interpret a calculator display using standard form and know how to enter numbers in standard form	Apply the index laws to calculate numbers. Use standard form to accurately work with very large and very small numbers. Use multiplication, division, addition, and subtraction when calculating with indices and standard form. Use a calculator to assist with standard form,	Understand the laws of standard form. Understand the laws of indices. Use a calculator to assist with calculating standard form.	Calculate using the laws of indices. Apply standard form when working with large and small numbers. Calculate using standard form.	Index Laws Standard form Multiplication Division Addition Subtraction	Computer programmers, engineering, economics, accountancy
Autumn	Properties of Shape and Angle Facts	Recall the properties and definitions of special types of quadrilaterals, including symmetry properties Recall and use properties	Consider all shape and their special features. Define the corresponding and alternative angles. Recall the number of degrees that are	Use and apply the properties of shape. Distinguish between the different types of triangles.	To be able to calculate missing degrees in triangles. To be able to calculate missing degrees in quadrilaterals.	Angles Triangle Quadrilateral Opposite Alternative Symmetry Vertically Parallel	Joinery, carpentry, builders, architects, construction, scaffolding

		of angles at a point, angles at a point on a straight line, right angles, and vertically opposite angles Derive and use the sum of angles in a triangle Use the side/angle properties of isosceles and equilateral triangles Show step-by-step deduction when solving problems Find missing angles using properties of corresponding and alternate angles Understand and use the angle properties of parallel lines.	in different shapes, including a straight line. Recall the different types of triangles and how each one is different to accurately calculate missing angles. Apply parallel lines in multi-step problems.	Know and apply the different number of degrees in a shape. Know and apply alternative and corresponding. Apply parallel lines accurately.	Use the knowledge of the number of degrees in different shares and then accurately calculate missing angles. Understand and apply the number of degrees on a straight line and around a point.	Isosceles Equilateral Scalene	
Autumn	Interior and Exterior Angles	Understand 'regular' and 'irregular' as applied to polygons Use the sum of angles of irregular polygons Calculate and use the sums of the interior	Determine the difference between regular and irregular in connection to polygons. Use the formula to find the number of	Determine the difference between regular and irregular polygons. Use the formula to find the number of degrees in a regular polygon.	To be able to find the number of degrees in polygons. Use the knowledge of polygons to find exterior and interior angles in	Regular Irregular Polygons Interior Exterior Angles	Joinery, construction, architect, surveyor, agriculture, plumbing

		angles of polygons Calculate and use the angles of regular polygons Use the sum of the interior angles of an n-sided polygon Use the sum of the exterior angles of any polygon is 360° Use the sum of the interior angle and the exterior angle is 180°	degrees in a polygon. Find the exterior and interior angles of a polygon. Extend to compound polygons.	Use the sum of the interior angles to find missing angles and extend to finding the exterior angles of a polygon.	both regular and irregular polygons. Extension question to look at compound polygons.		
Spring	3D and Volume	Identify and name common 3D shapes Sketch nets of cuboids and prisms Find the volume of a prism, including a triangular prism, cube and cuboid Calculate volumes of right prisms and shapes made from cubes and cuboids Convert between metric volume measures; Convert between metric measures of volume and capacity	Identify 3D shapes. Sketch 3D shapes and nets. Work out the volume of 3D shapes and correctly using metric units. Use the metric system correctly and give the correct metric measures for example square or cubed. Establish the links between volume and capacity.	Learn and recall the names of 3D shapes. Use squared paper to sketch nets of 3D shapes. Calculate volume and remember that the units are cubed. Correctly link between metric units and correctly use the units for area and perimeter.	Sketch accurately a net of 3D shapes. Find the surface area of 3D shapes and use the correct unit of measure. Find the volume of a 3D shape and correctly use the correct unit of measure.	Cuboids Pyramids Volume Surface area Metric Capacity	Architect, planning, computer designers, gaming, product design, construction, car design.

Spring	Real Life Graphs	Find the coordinates of points identified by geometrical information in 2D Find the coordinates of the midpoint of a line segment; Draw and interpret straight-line graphs for real-life situations Draw and Interpret distance–time graphs Draw velocity–time graphs and interpret gradient as the rate of change in distance	Use coordinates to draw an accurate line graph and able to find the midpoint of any line. Use a real-life situation, for example, the journey of a postman to draw this on a graph with explanation if required. Use a line graph to determine the gradient of a line and identify if it is positive or negative.	Find the coordinates to draw a straight-line graph. Identify the gradient from a straight line and be able to identify if it is positive or negative. Follow instructions on a real-life situation and be able to produce a graph with the correct measure to draw it.	Use a table to find the coordinates to extend drawing an accurate line graph. Identify the gradient of the line and extend to use in the straight-line equation – y=mc+c Draw and interpret a real-life situation and show it on a graph.	Gradient Coordinates Line graph Positive Negative	Supermarkets for determining their profit and loss, athletics, car mechanics
Spring	Ratio	Use a ratio to compare a scale model to a real-life object Calculate missing parts of a ratio when the difference is given Combining 2 ratios into one Problems involving mixing, e.g. paint colours, cement and drawn	Use ratio to split amounts. Use a multiplier to be able to correctly calculate each part of the ratio. Apply ratio to real life problems. Express the relationship between the ratios.	Find the multiplier for the ratio and apply it to show the correct parts. Use a real-life situation, for example mixing paint and display the answer in the form of a ratio.	Determine the ratio and be able to express it in correct notation. Use the multiplier to calculate the correct amounts. Use real life problems to find the different ratios.	Ratio Parts Scale Lengths Area Volume	Industry to establish the correct parts, for example paint, Food industry

		conclusions; Write a ratio as a linear function Write lengths, areas and volumes of two shapes as ratios in simplest form Express a multiplicative relationship between two quantities as a ratio or a fraction.					
Spring	Proportion	Solve word problems involving direct and inverse proportion Work out which product is the better buy Scale up recipes Convert between currencies Solve proportion problems using the unitary method Recognise when values are in direct proportion by reference to the graph form Understand direct proportion ---> relationship y = kx.	Use best value to identify which offer is more appropriate. Use direct and indirect proportion to accurately calculate correctly. Solve proportion problems, for example using recipes. Extend by using graphs to find out direct proportion, for example mobile phone charges.	Accurately take the values from a best value scenario and find the best offer. Determine the different between direct and indirect proportion. Use a graph to be able to identify the best value.	A real-life situation to compare three different offers and then determine the best value. Use a recipe to determine how much of each of the ingredients are needed to complete the recipe. Interpret and sketch a real life problem using a best value problem.	Proportion Direct Inverse Scale Currencies	Food industry, supermarkets for determining stock, DIY shop for mixing paints.

Summer	Compound Measures	Understand and use compound measures: density; pressure; speed Convert between metric speed measures Calculate average speed, distance, time – in miles per hour as well as metric measures	Determine the relationship between speed, distance, and time.	Understand the relationship between speed, distance and time and be able to use the formula to find the correct unit of measure. Use real life problems, for example, average speed.	Learn and recall the formula for speed distance and time and be able to calculate various calculations. Use real life situations, for example, which runner will come first to determine their speed, distance, and time.	Density Average Speed Distance Time	
Summer	Probability 1	Mark events and/or probabilities on a probability scale of 0 to 1 Write probabilities in words or fractions, decimals and percentages Find the probability of an event happening using theoretical probability List all outcomes for single events systematically Work out	Understand that probabilities are between 0 and 1. Use the probability scale to the likelihood of events happening on a probability line. Use percentages to show the outcomes of probabilities and extend this with two-way tables. Extend to find missing probabilities by converting the	Use the probability line to list outcomes. Convert probabilities into decimals to assist in finding missing probabilities. Extend the use of probability in other charts, for example, two-way tables and frequency tables.	Be able to place probabilities on a scale. Calculate probabilities and be able to interpret. Combine other statistical measures to show the likelihood of events occurring.	Probability Events Certain Likely Unlikely Impossible	Sport outcomes, Insurance, Traffic signals, Medicine, Election results

		probabilities from frequency tables and two-way tables Add simple probabilities Identify different mutually exclusive outcomes and know that the sum of the probabilities of all outcomes is 1 Find a missing probability from a list or table including algebraic terms	probabilities to decimals.				
Summer	Probability 2	Estimate the number of times an event will occur, given the probability and the number of trials Work out probabilities from Venn diagrams Use union and intersection notation Compare relative frequencies from samples of different sizes Find the probability of	Working with real life situations determine the number of time events will occur. Extend probabilities and use with Venn diagrams. Use relative frequencies to find missing probabilities and present them in decimal or percentage notation.	Determine the difference between mutually exclusive and independent. Convert probabilities into decimals to establish relative frequency. Construct a Venn diagram and use probabilities. Construct and complete a tree diagram for tow or more events and then extend to	Use probability to determine the outcome of events. Apply the rules of probability to determine the equivalent decimal or percentage. Determine the relative frequency. Construct and interpret Venn diagrams.	Probability Venn Diagrams Relative Frequency Tree diagrams Sample size Independent Mutually exclusive	Sport outcomes, Insurance, Traffic signals, Medicine, Election results

		successive events, such as several throws of a single dice Use tree diagrams to calculate the probability of two independent events Use tree diagrams to calculate the probability of two dependent events	Extend into probability trees. Determine if events are independent or mutually exclusive. Calculate the outcomes of probabilities using tree diagrams notation.	calculate the outcome of the given event.	Extend into constructing a tree diagram and use probabilities correctly to determine the outcome of two or more events. Understand and explain the difference between independent and mutually exclusive.		
Summer	Fractions and Reciprocals	Add, subtract, multiply and divide mixed number fractions Understand and find the reciprocal of an integer, decimal or fraction	Be able to use the rules of fractions to complete calculations. Understand reciprocals and how they are used in calculations.	Add and subtract fractions. Convert fractions into mixed numbers. Multiply and divide fractions using rules.	Add and subtract fractions. Convert fractions into decimals and mixed numbers. Divide and multiply fractions. Use reciprocals in calculations.	Fraction Denominator Improper Multiply Divide Integer Reciprocals	Fractions are in common use in society for a multitude of situations and it is common to see fractions in everyday life.

Subject Information including exam board details:

The key stage 4 curriculum is following the scheme of work for AQA. As part of the scaffolding, we use the white rose scheme to ensure that pupils are challenged and aiming for a good pass at GCSE. Pupils will be tested at the end of each term to monitor progress and ensure that pupils are achieving the correct level. If pupils are identified for under achievement, then intervention will be applied so that they can be given the support to help them gain more confidence and go on to achieve their potential.

Careers linked to this subject area:

Education, Engineering, Finance, Banking, Accountancy, Engineering, Economist, Data analysis, Electrical engineer, Meteorologist, software developer, Stockbroker

Enrichment Opportunities:

Enrichment is the **enhancement of mathematical experiences** and may feature the study of mathematics beyond the standard curriculum as defined by the requirements of any external examinations. Alternative and creative approaches to topics, including open-ended investigations. Accessible aspects of mathematics lying outside the curriculum.