

Maths Department - Year 7

<p><i>The Year 7 curriculum begins with a week dedicated to providing students with opportunities to explore the wonder of Mathematics and engage with Mathematics in ways that many students have not yet experienced in their education. The curriculum covers the fundamental topics from the six key concepts of Mathematics at Key Stage 3: Algebra, Geometry and Measures, Number, Ratio, Proportion and Rates of Change, Probability and Statistics. Whilst prior knowledge is consolidated from KS2, students are also exposed to rigorous mathematical communication, logic and reason.</i></p>						
 Shirley High Curriculum Map	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:
	(IWM) Inspirational week of maths (1) Analysing and displaying data (2) Number skills	(3) Equations, functions and formulae (4) Decimals and measures	(5) Fractions and percentages (6) Probability	(7) Ratio and proportion	(8) Angles and shapes	(9) Sequences (10) Transformations
Why Now?	<p>(IWM) The inspirational week of maths is designed to allow year 7 pupils to develop a good relationship with the subject and their teacher by realising that maths can be explored in many different ways.</p> <p>(1) This unit consolidates learning for all abilities at KS2 and aims to eliminate any misconceptions that have arisen due to non-specialist teaching.</p> <p>(2) All pupils – including higher ability – are introduced to robust mathematical methodology that can be best utilised in future learning.</p>	<p>(3) Skills learnt in unit 2 will allow pupils to access more challenging content for this unit.</p> <p>(4) Skills learnt in units 2 and 3 will allow pupils to access more challenging content for this unit.</p>	<p>(5) This unit intuitively follows on from unit 4 due to the relationship of equivalence between fractions, decimals and percentages.</p> <p>(6) This unit intuitively follows on from units 4 and 5 as probabilities can only be expressed as a fraction, decimal or percentage.</p>	<p>(7) The theme of fractions, decimals and percentages [FDP] continues in this unit as pupils understand the link between FDP and proportionality.</p>	<p>(8) This unit builds upon the skills acquired in units 3 and 4 for pupils of all abilities, whilst the most able pupils will be stretched and challenged through problem solving questions that require recall from units 5, 6 and 7.</p>	<p>(9) Through the study of sequences and graphs in this unit pupils will begin to learn about the fluid intricacy of mathematics.</p> <p>(10) Similarly to unit 9, this unit of work will combine fundamental concepts from previously learned units that pupils may not have recognised as being related.</p>
Fundamental Concepts	Number Algebra Geometry and measures Statistics	Number Algebra Geometry and measures	Number Probability	Ratio, proportion and rates of change	Geometry and measures	Algebra Geometry and measures
Students will learn about ...	<p>(IWM) Sharing their thinking. Working in groups. The factorial operation. Thinking visually about mathematics. The importance of depth as opposed to speed in maths. The reward of perseverance and benefits of challenge. Using mathematical reasoning to support thoughts, ideas and calculations. The connection between mathematics and patterns. The benefits of making mistakes in the process of learning.</p> <p>(1) Finding the mode of a set of data. (numerical and non-numerical) Finding the median, mean and range of a set of data. Finding the mode and range from charts and tables. Finding the modal class from a bar chart or frequency table. Comparing sets of data using averages and measures of spread. Reading and drawing tally charts and frequency tables. Reading and drawing bar charts for ungrouped and grouped data. Drawing and interpreting pictograms. Reading and drawing line graphs.</p> <p>(2) The priority of operations and laws of arithmetic. Recalling and using mental multiplication up to 10x10 for multiplication and division. Multiplying by multiples of powers of 10 up to 1000. Rounding integers and decimals. Using written methods for adding, subtracting, multiplying and dividing integers. Using estimation and inverse operations to check answers. Using positive and negative integers. Ordering positive and negative numbers. Adding, subtracting, multiplying and dividing negative integers. Recognising and using factors, multiples and prime numbers. Finding all the factor pairs for integers.</p>	<p>(3) Finding outputs of simple functions written in words and using symbols Describing simple functions in words Simplifying expressions by collecting like terms. Multiplying and dividing algebraic terms Using letters to represent variables Using brackets with expressions. Writing expressions from word descriptions and representing function machines. Substituting values into written formulae and formulae expressed algebraically. Writing simple formulae in words and algebraically. Identifying formulae and functions. Identifying variables.</p> <p>(4) Measuring and drawing lines to the nearest millimetre. Ordering integers and decimals. Rounding to the nearest integer. Using rounding decimals to make estimations. Multiplying and dividing by powers of ten. Comparing measurements by converting them into a common unit. Converting between metric units of length, mass and capacity. Solving simple problems involving units of measurement in the context of length, mass and capacity. Reading scales. Using scale diagrams. Adding, subtracting, multiplying and dividing decimals. Calculating the perimeter of regular and composite shapes. Calculating the area of regular and composite shapes.</p>	<p>(5) Identifying fractions. Representing fractions by shading the equivalent area of a shape. Ordering fractions. Identifying equivalent fractions. Simplifying fractions into their simplest form. Converting between mixed numbers and improper fractions. Adding and subtracting fractions. Finding fractions of an amount. Expressing one amount as a fraction of another. Using equivalent fractions, decimals and percentages. Relating percentages with fractions out of 100. Finding percentages of amounts. Expressing one quantity as a percentage of another.</p> <p>(6) Using mathematical terminology related to probability. Using the probability scale. Using likelihoods in relation to the probability scale. Calculating probability based on equally likely outcomes. Calculating probabilities that involve the addition of multiple independent events. Calculating the probability of an event not occurring using the exhaustive property of probability. Recording data from a simple experiment. Calculating experimental probability. Using an experimental probability to calculate relative frequency.</p>	<p>(7) Solving problems involving direct proportion. Writing and simplifying ratios. Finding equivalent ratios. Sharing an amount by a given ratio. Using ratio to problem solve. Using ratio scale and measures. Using fractions, decimals and percentages to compare proportions.</p>	<p>(8) Identifying acute, obtuse and reflex angles. Estimating the size of an angle having identified the type of angle. Drawing triangles accurately using a protractor. Identifying and labelling angles and lines. Using angle facts to problem solve. Finding missing angles in triangles. Using the properties of 2D shapes to problem solve. Finding missing angles in quadrilaterals.</p>	<p>(9) Generating and describing simple sequences. Finding and using the n^{th} term of a sequence. Generating and describing special sequences and patterns. Identifying and plotting coordinates in all four quadrants. Recognising and plotting straight line graphs. Relating graphs with sequences and functions.</p> <p>(10) Describing and identifying congruence. Identifying line and rotational symmetry. Describing and mapping reflections, rotations and translations. Recognising a combination of transformations. Performing consecutive transformations to an object. Identifying enlargements and scale factors.</p>

	<p>Identifying common factors and, ultimately, the highest common factor.</p> <p>Identifying common multiples and, ultimately the lowest common multiple.</p> <p>Knowing square numbers and their corresponding square roots.</p> <p>Using a calculator to find squares and square roots.</p> <p>Using index form for expressions.</p> <p>Mentally calculating squares and square roots.</p> <p>Rounding money to the nearest pound or penny.</p> <p>Interpreting a calculator display in different contexts.</p> <p>Solving problems involving money and time using a calculator.</p>					
Language for Life (Key terms/Vocabulary)	<p>(1) Data, value, range, mode, modal, median, pictogram, key, bar chart, bar-line chart, tally chart, frequency, frequency table, groups, classes, grouped tally chart, modal class, grouped frequency table, mean, average, compare, line graph, dual bar chart, compound bar chart, spreadsheet, cells.</p> <p>(2) Priority of operations, BIDMAS, partitioning, round, estimation, column method, approximation, inverse, divisible, positive, negative, greater than, less than, multiple, factor, Venn diagram, common factors, prime, highest common factor, common multiples, lowest common multiple, square numbers, square root, inverse, index, indices.</p>	<p>(3) Function, function machine, inputs, outputs, distributive law, simplify, expressions, like terms, expand, variable, formula, unknown, substituting.</p> <p>(4) Place value, decimal place, 1 d.p. Length, millimetre (mm), centimetre (cm), metre (m), kilometre (km), mass, gram (g), kilogram (kg), capacity, millilitre (ml), litre (l), x-axis, y-axis, doubling and halving, partitioning, magnitude, approximate, zero place holder, regular polygon, perimeter, area, units, metric units, imperial units.</p>	<p>(5) Fraction, numerator, denominator, unit fraction, improper fraction, mixed number, equivalent fractions, simplify, cancelling, simplest forms, per cent, percentage, jottings.</p> <p>(6) Probability, chance, even chance, probability scale, fair, event, outcome, successful outcomes, random, experiment, experimental probability, model, expected number.</p>	<p>(7) Unitary method, direct proportion, ratio, highest common factor, simplifying, metric units, proportions, percentage</p>	<p>(8) Reflex, perpendicular, parallel, vertex, vertices, symmetrical, protractor, midpoint, angle of incidence, angle of reflection, vertically opposite, interior, exterior, diagonal.</p>	<p>(9) Sequence, term, term-to-term rule, increase, ascending, decrease, descending, infinite, finite, x-coordinate, y-coordinate, midpoint, line segments, arithmetic sequence, common difference, parallel, position-to-term rule, nth term.</p> <p>(10) Congruent, corresponding sides, corresponding angles, enlargement, scale factor, object, image, line of symmetry, order of rotational symmetry, plane of symmetry, reflection, transformation, mirror line, lines of reflection, equations, clockwise, anticlockwise, rotation, centre of rotation, translation.</p>
Extended writing Opportunities	After the end of year assessment pupils write a reflection based on the assessment.	After the end of year assessment pupils write a reflection based on the assessment.	After the end of year assessment pupils write a reflection based on the assessment.	After the end of year assessment pupils write a reflection based on the assessment.	After the end of year assessment pupils write a reflection based on the assessment.	After the end of year assessment pupils write a reflection based on the assessment.
Maths Across the Curriculum	<p>(IWM) Pupils investigate an interesting representation of numbers designed by computer scientist and artist, Stephen Von Worley. Pupils learn the significance of visual interpretation and consideration in mathematics, which can in turn help them to better understand the works of artists they may study about in art. Pupils will be exposed to the connection between science and mathematics during the Pascal's triangle activity.</p> <p>(1) Pupils learn statistical techniques that are used in many other subjects such as science, geography and psychology.</p> <p>(2) Factors is a concept that links to common morals or ideology which may arise in subjects such as religious studies, modern foreign languages, English language and literature, history and geography.</p>	<p>(3) Pupils learn the fundamental concepts of algebra that are used in subjects such as biology, chemistry, physics, computer science and geography.</p> <p>(4) Converting between metric units is used in subjects such as science, food technology and geography. Reading scales is used in science and food technology. Calculating areas is used in science and design and technology</p>	<p>(5) Fractions and percentages are used in subjects such as food technology, geography, English, history, design and technology and media. Assessments across all subjects in the curriculum will be reported back to pupils as either fractions or most commonly percentages. Therefore pupils will have the necessary skills to understand and evaluate their attainment.</p> <p>(6) Likelihoods are commonly referred to in discussions in personal development and scientific experiments. Experimental probabilities are used in scientific experiments and field research in geography.</p>	<p>(7) Ratios and proportionality arise in subjects such as food technology, design and technology, science and geography.</p>	<p>(8) Angles are commonly used in physics but will also be expected to use and measure them in KS3 geography.</p>	<p>(9) Sequences and pattern recognition is a transferrable skill that can be utilised when analysing poetry in English. It is also useful in data analysis during scientific experiments and music.</p> <p>(10) Transformations are often used in art, media and design and technology.</p>
Links to careers/aspirations	<p>(IWM) Through learning how to approach mathematics in a different way than many of the pupils will have experienced so far in the education, pupils will be exposed to a fundamental skill in entrepreneurial thinking.</p> <p>(1) Pupils learn to use fundamental statistical techniques that are widely used in a range of professions from sports commentator to community management.</p> <p>(2) Pupils will acquire key skills for careers in finance and accounting.</p>	<p>(3) Pupils learn the fundamental concepts of algebra that are used in careers involving astrology, architecture, computer engineering, market research analysis, fiancé and economy.</p> <p>(4) Pupils learn how to convert between units of measurement as well as how to read scales. These are two fundamental skills used in any manufacturing industry.</p>	<p>(5) Fractions and percentages, along with decimals, are imperative in the fields of data analysis, community management and journalism.</p> <p>(6) Probability and in particular experimental probability is prevalent in the pharmaceutical and scientific research industries.</p>	<p>(7) Ratio and proportion is an essential tool in the culinary industry. It is also used in architectural and engineering careers.</p>	<p>(8) Pupils learn how to accurately draw angles which is a key skill in drawing plans in architecture.</p>	<p>(9) Pattern recognition is an extremely valuable tool in careers involving statistical analysis, market research and economy.</p> <p>(10) Transformations are used in industries such as art, interior design and carpentry.</p>

<p>Cultural Capital</p>	<p>(IWM) Pupils are exposed to the history of mathematics in the Pascal's triangle activity. Pupils have the opportunity to see the work of computer scientist and artist Stephen Von Worley.</p> <p>(1) Pupils are exposed to data that differentiates between types of accommodation such as detached, semi-detached and terraced housing and flats. Pupils learn that statistics can be misleading which will better prepare them to think independently when exposed to advertising and marketing campaigns across social media clubs.</p> <p>(2) Pupils learn about advertising charges and costs when items are sold through online platforms. Pupils learn about negative numbers and temperature which will help them to appreciate differences in climate across the world.</p>	<p>(3) Pupils are exposed to a method of solving linear equations known as balancing. This idea can be used as a template for pupils to understand social distress with regards to issues involving equality. By understanding that with equations, like forces in physics, one action must have an equal and opposite action in order to maintain balance.</p> <p>(4) Pupils learn how to convert between different metric units which can help broaden their understanding of their diet. This is particularly useful for pupils to understand just how much fizzy or energy drinks they are consuming within a period of time such as a day or a week.</p>	<p>(5) Pupils learn how to find percentages of amounts. This empowers pupils to be better informed when shopping. They can independently assess whether the reduction offer on a product they may be interested in buying has been accurately advertised in terms of its percentage reduction.</p> <p>(6) In a society whereby gambling is becoming more popular and easier to access pupils learn valuable skills that will enable them to understand the likelihood of a favourable outcome of an event occurring. This in turn may better prepare them to show caution when participating in gambling in their young adulthood.</p>	<p>(7) Pupils learn that not everything is shared equally among beneficiaries. They will also learn how ratio is vital in order to adapt recipes designed for a specific number of people in order to increase quantity without compromising quality.</p>	<p>(8) Pupils will appreciate that despite having obvious similarities quadrilateral shapes are not all the same. This process of appreciating all the properties of 2D shapes can then be linked to stigma and stereotyping in society.</p>	<p>(9) Pattern recognition is sometimes referred to as the most important skill in mathematics. Pupils learn that this is also true for day to day life whether it be noticing a pattern between eat habits and weight or sleeping habits and mood, the recognition of a pattern can often be the first step on the journey to make change.</p> <p>(10) Pupils learn how to perform transformations which can often develop a pupil's imagination in terms of spatial awareness. This can then be used in an organisational context such as layouts of furniture in a room.</p>
<p>Practical Application of Skills</p>	<p>(IWM) Pupils learn how to be resilient when realising the benefits of being challenged but persisting rather than giving up. Through thinking more deeply in these activities, pupils can go on to apply a similar approach to their thinking in day to day life.</p> <p>(1) Pupils can use their understanding of range when shopping for items online to appreciate that the first price they see may not be the cheapest price available for that product.</p> <p>(2) Pupils learn skills that are used in day to day life tasks such as shopping and time management.</p>	<p>(3) Pupils can use their understanding of equations and formulae to better understand how they are billed for electricity, gas, water, a meal at a restaurant or an Uber journey.</p> <p>(4) Being able to read scales and convert between units are essential when cooking and following a recipe.</p>	<p>(5) Pupils learn how to calculate a percentage of an amount which can help them to identify if a sale price is a significant enough discount to warrant a purchase.</p> <p>(6) By understanding the relationship between the probability scale and likelihoods pupils can reflect on what actions will improve the likelihood or increase the probability of a favourable outcome of an event.</p>	<p>(7) Pupils learn how to share quantities in a given ratio and how to keep variables in proportion. These skills are useful when cooking by following or adapting a recipe.</p>	<p>(8) Pupils learn how to measure angles which will enable them to correctly set up equipment, such as a computer in such a way that is best suited for their body and eyesight.</p>	<p>(9) Pupils can use their understanding of pattern recognition to improve their ability to plan journeys, noticing the patterns of what times areas tend to have more traffic or public transport is most busy.</p> <p>(10) Pupils can use their ability to perform different transformations to better organise furniture in a room, or items on a desk.</p>