Hampshire Services
HIAS SCHOOL IMPROVEMENT

HIAS Maths Team

Year 8 Autumn Term 2020 Scheme of Learning

An outline plan designed to take account of the national school closures between March 2020 and June 2020.

May 2020
Final version

Hampshire County Council

Introduction

This learning schedule is based on the Hampshire Mathematics Scheme of Learning and is designed to take account of the national school closures between March 2020 and July 2020. Learners will begin a new academic year in need of catch-up and consolidation, together with some new learning from the previous academic year that has been missed. This document focusses on the core skills , knowledge and understanding that an 'on-track' learner would be expected to bring to the next stage of their learning and acknowledges that, for many, the habits of learning and the facility to recall previously embedded knowledge will need attention. For this reason, the first elements of this Autumn Term plan address the end of year objectives from the previous year. As the term progresses, the plan seeks to integrate expected prior learning, previously assumed and now no longer can be, into the standard units from the original scheme. In this way, the aim is to build on what is known and recalled in a moderately accelerated way to help learners get back on track for the end of the 20/21 academic year.

Teachers will need to adapt this schedule to the needs of their learners and to the number of hours study allocated in the timetable to mathematics.

The Hampshire Mathematics team full scheme of learning for KS3 (Y7-Y9) offers long and medium-term maps plus linked units of work with key tasks and teaching points. This is available to schools subscribing to Moodle Plus (for further information, please click here).

Year 8

Week commencing	Unit	Area of study	Objectives	Key teaching points/ facts focus/ 'Big Ideas'
Thurs 03-09-2020	**START OF NEW ACADEMIC YEAR**			
Mon 07-09-2020	**7.10**	**Coordinates:** **Four quadrants** **Linear functions**	**Work with coordinates in all four quadrants** **Recognise, sketch and produce graphs of linear functions in one variable using equations in x and y in the Cartesian plane**	Number lines extend indefinitely from zero in the positive and negative directions The number line can be represented horizontally (x-axis) or vertically (y-axis) When two number lines intersect at right angles at zero, we create a four quadrant coordinate system that enables us to describe the position of an individual point using the (x,y) notation. The general equation for a straight line is y=mx+c. m describes the gradient, or slop, of the line and c describes the point at which the line intercepts the y-axis (x=0) Parallel lines have the same gradient When generating pairs of coordinates, the y-coordinate is a function of (is dependent on) the x-coordinate according to the equation of the line.
Mon 14-09-2020	**7.12**	**Statistics:** **Frequency tables**	**Describe, interpret and compare observed distribution of a single variable through data sets from**	For univariate (one variable) empirical (based on real life scenarios) distributions:

		Pie Charts **Line graphs**	**univariate empirical distributions through appropriate measures of central tendency (mean, median, mode) and spread (range)** **Construct and interpret appropriate tables, charts and diagrams, including frequency tables, bar charts, pictograms and pie charts for categorical data** **Construct and interpret vertical line or bar charts for ungrouped numerical data.**	To find the mean of a data set, sum al the elements and divide by the number in the set. To find the median of a data set, locate the middle value when the data is ordered. For an odd number of elements, the median will appear as a value. For an even number of elements, the median will be half-way between the two middle values. The mode is the most common value. A data set can be bi-modal (with two modes) or multi-model (with multiple modes) The range is the difference between the largest and the smallest numerical value in the set. Categorical data can be displayed using pictograms and bar charts. The scale or key can be helpful or misleading. Categorical data can be collected using a tally chart and then ordered and recorded in a frequency table. This allows the measures of spread and central tendency to be calculated. For pie charts: 360^0 = 100% = 1 whole circle

				To calculate the percentage required to represent the data, x, from a set of number, n: $\frac{x}{n}$ x 100% To calculate the fraction of the circle for each sector, show the number of degrees as the numerator and 360 as the denominator. Simplify as appropriate Pie charts can show the mode clearly Ungrouped numerical data can be displayed and interpreted using a vertical line graph (or bar chart). It can show measures of central tendency and spread.
Mon 21-09-2020	**7.13**	**Geometry:** **Perimeter, area and Volume**	**Derive and apply formulae to calculate and solve problems involving perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders)**	The perimeter of any closed 2-D shape is the total distance around the outside edges. The area of a rectangle is length x width The area of a triangle is ½ (base x height). It is also half of the surrounding rectangle. The area of a parallelogram is base x perpendicular height

				The area of a trapezium is the mean average length of the two parallel sides x the perpendicular height (or half the sum of the parallel sides x the distance between them) The volume of a cuboid is length x width x height The volume of any prism is the area of the cross-section x length.
Mon 28-09-2020	**7.13**	**Geometry:** **Perimeter, area and Volume**	**Calculate and solve problems involving perimeters of 2-D shapes (including circles) , areas of circles and composite shapes**	The circumference of a circle is calculated as π x diameter The area of a circle is calculated as π x radius^2 π is defined as the number of diameters (3.142….). It is the ratio of a diameter to its circumference
Mon 05-10-2020	**7.15** **8.1**	**Y7 Place value and Number:** **Fractions, decimals and percentages** **Y8:** **Four operations with fractions**	**Understand and use place value for decimals.** **Order positive and negative decimals and fractions** **Use the number line as a model for ordering real numbers**	Laws of arithmetic and how they apply to integers and decimal numbers Commutative, distributive and associative laws linked to BIDMAS Use of informal and formal written methods when calculating with integers and decimals

			Use the symbols =, ≠ , < , > , ≤ and ≥ **Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2)** **Use the four operations applied to all real numbers (including proper and improper fractions, and mixed numbers)** **Interpret fractions and percentages as operators**	Know and use a range of symbols that denote equality and inequality. Find the lowest common denominator when adding and subtracting fractions Use bar modelling to find fractions and percentage quantities
Mon 12-10-2020	**8.1**	**Place value and number:** **Four operations with measure** **Directed number** **Primes**	**Understand and use place value for decimals, measures and integers of any size** **Use four operations applied to decimals in the context of measure** **Use four operations applied to positive and negative numbers** **Use prime factorisation including using product notation and the unique factorisation**	Number lines extend indefinitely from zero in the positive and negative directions Explore the effect of adding/subtracting/multiplying and dividing by a negative number. Know or be able to identify primes to 100 Ensure students are secure with x / ÷ of powers of ten Multiply by using factors rather than by partitioning 27 x 3 = (9x3) x3 = 9 x (3 x 3) = 9 x 9 = 81

			property (every number greater than 1 is either a prime number itself or can be represented as the product of primes. This representation is unique (except for the order of factors) **Express numbers as products of primes**	Develop multiplying by factors into prime factorisation (27 x 3 = 9 x 3 x 3 = 3 x 3 x 3 x 3 = 3^4 = 81)
Mon 19-10-2020	**7.11** **8.2**	**Geometry:** **Angles and lines**	**Apply the properties of angles at a point, on a straight line and vertically opposite angles.** **Derive and use the sum of the angles in a triangle** **Use the sum of the angles in a triangle to deduce the angle sum of any polygon** **Understand and use the relationship between parallel lines and alternate and corresponding angles.**	Secure number bonds within 360 (90, 180, 270…) Secure parallel, perpendicular and labelling conventions Know the sum of the angles: • round a point is 360° • on a straight line is 180° • in a right angle is 90° • in any triangle is 180° • in any quadrilateral is 360 ° Derive interior angle size and sum for regular polygons such as pentagon, hexagon and octagon Ensure written and oral reasoning when identifying missing angles Know that vertically opposite angles are equal

				Know that alternate angles are equal Know that corresponding angles sum to 180^0
Mon 26-10-2020	**HALF TERM**			
Mon 02-11-2020	**7.11** **8.2**	**Geometry:** **Property of shape** **Transformations**	**Identify properties of, and describe results of, translations, rotations and reflections applied to given figures** **Derive and illustrate properties of triangles, quadrilaterals, circles and other plane figures (for example, equal lengths and angles) using appropriate language and technology**	Know that a square is a special case of all other named quadrilaterals and why. Annotation of diagrams with correct notation and conventions used Know the sum of the angles: • round a point is 360^o • on a straight line is 180^o • in a right angle is 90^o • in any triangle is 180^o • in any quadrilateral is 360^o Reason orally, pictorially and in writing about derived knowledge of shapes.
Mon 09-11-2020	**8.3**	**Probability:** **Mutually exclusive outcomes**	**Use the 0-1 probability scale** **Understand that the probabilities of all possible outcomes sum to 1**	Secure equivalence of fractions, decimals and percentages Secure addition and multiplication of fractions in the context probability (i.e. multiply = and / addition = or) Know the contents of a pack of playing cards

			Explore what can and cannot be inferred in probabilistic settings and express argument formally **Introduce sample space diagrams**	Ensure that students are secure with the 0-1 number line (link it to 0-10 number bonds and 0-100 bonds for percentage probabilities) Carry out probability experiments with two mutually exclusive outcomes to introduce sample spaces (coin toss)
Mon 16-11-2020	**8.4**	**Ratio and proportion: Percentage change**	**Understand that a multiplicative relationship between two quantities can be expressed as a fraction or a ratio** **Divide a given quantity into a ratio with more than two parts** **Express the division of a quantity into two or more parts as a ratio using appropriate notation (:)** **Solve problems involving percentage change including percentage increase, decrease and original value problems and simple interest in financial mathematics.** **Work with percentages greater than 100%**	Use bar models to support an understanding pf percentage change. Identify what is the whole and what are the parts? Use ‘four corners’ or the ‘box method’ as a model to support conversions Encourage students to consider the statement ‘for every’ when thinking about change and ratio. For example, ‘For every £3 I have, you have £8’ can be expressed as 3:8 in ratio notation. Use bar models to show % greater than 100%

Mon 23-11-2020	**7.14** **8.5**	**Algebra:** **Y7: Sequences** **Y8: Arithmetic sequences**	**Generate terms of a sequence either from a term-to-term rule or a position-to-term rule** **Recognise arithmetic sequences and find the nth term** **Recognise geometric sequences and appreciate other sequences that arise**	Pattern spotting Identify multiples and factors Be able to step count from any number in different sized steps (forward and back) Recognise an arithmetic sequence is a linear progression and identify the constant difference as the coefficient of ‘n’, the position of the term Sequences can be generated by additive or multiplicative increases or decreases Explore other sequences such as Fibonacci and triangular numbers.
Mon 30-11-2020	**8.5**	**Algebra:** **Linear equations** **Equation of a straight line**	**Simplify and manipulate algebraic expression by taking out common factors** **Solve linear equations, including factorising and rearranging** **Reduce a given linear equation in two variables to the standard form y=mx+c**	Find factor pairs of numbers up to 50 Use bar models to show solving using a balance method and an elimination method Know that m represents the gradient and c represents the y-intercept Know that as m increases the line gets steeper

			Calculate and interpret gradients and intercepts of graphs such as linear equations numerically, graphically and algebraically	Know that as c changes , the line slides up and down the y-axis/grid
Mon 07-12-2020	**7.14** **8.5**	**Algebra: Laws of indices**	**Use conventional notation for the priority of operations, including brackets, powers, roots and reciprocals** **Use integer powers and associated real roots** **Recognise powers of 2,3,4 and 5**	Squaring and cubing numbers and then variables Commutative, distributive and associative laws linked to BIDMAS Laws of indices
Mon 14-12-2020	**7.14** **8.5**	**Algebra:** **Y7: Formulae** **Y8: Formulae and rearranging**	**Substitute numerical values into formulae and expressions, including scientific formulae.** **Simplify and manipulate algebraic expressions to maintain equivalence by collecting like terms and multiplying over a bracket** **Use algebraic methods to solve linear equations in one variable, including rearranging**	Laws or arithmetic and how they apply to algebraic conventions Commutative, distributive and associative laws linked to BIDMAS Use bar models to show rearranging and solving equations
Mon 21-12-2020	**CHRISTMAS**			

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