

**Year 8****Autumn Term****Unit 1****Number/Algebra 1****6 Hours**

	<b>Core Objective</b>	<b>NNS</b>	<b>Resources</b>	<b>Support</b>	<b>Plenary</b>	<b>Homework</b>
<b>Lesson 1</b>	<b>Add, subtract, multiply and divide integers.</b>	Integers, powers and roots				
<b>Lesson 2</b>	Recognise and use multiples, factors (divisors), common factor, highest common factor, lowest common multiple and primes; find the prime factor decomposition of a number (e.g. $8000 = 2^6 \times 5^3$ ).	Integers, powers and roots				
<b>Lesson 3</b>	Use squares, positive and negative square roots, cubes and cube roots, and index notation for small positive integer powers.	Integers, powers and roots				
<b>Lesson 4</b>	Generate and describe integer sequences.	<b>Sequences and functions</b>				
<b>Lesson 5</b>	Generate terms of a linear sequence using term-to-term and position-to-term definitions of the sequence, on paper and using a spreadsheet or graphical calculator.	<b>Sequences and functions</b>				
<b>Lesson 6</b>	Begin to use linear expressions to describe the $n$ th term of an arithmetic sequence, justifying its form by referring to the activity or practical context from which it was generated.	<b>Sequences and functions</b>				

Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Order, add, subtract, multiply and divide integers.</li> <li>Multiply and divide decimals by 10, 100, 1000.</li> <li>Count on and back in steps of 0.4, 0.75, <math>\frac{3}{4}</math>...</li> <li>Round numbers, including to one or two decimal places.</li> </ul>		

What all should know	What most should know	What some should know
<ul style="list-style-type: none"> <li>Understand negative numbers as positions on a number line; order, add and subtract positive and negative integers in context.</li> </ul>	<ul style="list-style-type: none"> <li><b>Add, subtract, multiply and divide integers.</b></li> </ul>	
<ul style="list-style-type: none"> <li>Use simple tests of divisibility.</li> </ul>	<ul style="list-style-type: none"> <li>Recognise and use multiples, factors (divisors), common factor, highest common factor, lowest common multiple and primes; find the prime factor decomposition of a number (e.g. <math>8000 = 2^6 \times 5^3</math>).</li> </ul>	<ul style="list-style-type: none"> <li>Use the prime factor decomposition of a number.</li> </ul>
<ul style="list-style-type: none"> <li>Recognise the first few triangular numbers, squares of numbers to at least <math>12 \times 12</math> and the corresponding roots.</li> </ul>	<ul style="list-style-type: none"> <li>Use squares, positive and negative square roots, cubes and cube roots, and index notation for small positive integer powers.</li> </ul>	<ul style="list-style-type: none"> <li>Use ICT to estimate square roots and cube roots.</li> <li>Use index notation for integer powers and simple instances of the index laws.</li> </ul>
	<ul style="list-style-type: none"> <li>Generate and describe integer sequences.</li> </ul>	
<ul style="list-style-type: none"> <li>Generate terms of a simple sequence given a rule.</li> </ul>	<ul style="list-style-type: none"> <li>Generate terms of a linear sequence using term-to-term and position-to-term definitions of the sequence, on paper and using a spreadsheet or graphical calculator.</li> </ul>	
<ul style="list-style-type: none"> <li>Generate sequences from practical contexts and describe the general term in simple cases.</li> </ul>	<ul style="list-style-type: none"> <li>Begin to use linear expressions to describe the <math>n</math>th term of an arithmetic sequence, justifying its form by referring to the activity or practical context from which it was generated.</li> </ul>	

**Year 8**

**Autumn Term**

**Unit 2 SSM 1**

**6 Hours**

	<b>Core Objective</b>	<b>NNS</b>	<b>Resources</b>	<b>Support</b>	<b>Plenary</b>	<b>Homework</b>
<b>Lesson 1</b>	<ul style="list-style-type: none"> <li>Identify alternate angles and corresponding angles; understand a proof that:               <ul style="list-style-type: none"> <li>the sum of the angles of a triangle is <math>180^\circ</math> and of a quadrilateral is <math>360^\circ</math>;</li> <li>the exterior angle of a triangle is equal to the sum of the two interior opposite angles.</li> </ul> </li> </ul>	Geometrical reasoning: lines, angles and shapes				
<b>Lesson 2</b>	As above	Geometrical reasoning: lines, angles and shapes				
<b>Lesson 3</b>	Solve geometrical problems using side and angle properties of equilateral, isosceles and right-angled triangles and special quadrilaterals, explaining reasoning with diagrams and text; classify quadrilaterals by their geometric properties.	Geometrical reasoning: lines, angles and shapes				
<b>Lesson 4</b>	<ul style="list-style-type: none"> <li>Use straight edge and compasses to construct:               <ul style="list-style-type: none"> <li>the mid-point and perpendicular bisector of a line segment;</li> <li>the bisector of an angle;</li> <li>the perpendicular from a point to a line;</li> <li>the perpendicular from a point on a line.</li> </ul> </li> </ul>	Construction				
<b>Lesson 5</b>	Investigate in a range of contexts: shape and space.	Solving problems				
<b>Lesson 6</b>	As above	Solving problems				

Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>• Know and use squares, positive and negative square roots, cubes of numbers 1 to 5 and corresponding roots.</li> <li>• Convert between fractions, decimals and percentages. Find fractions and percentages of quantities.</li> </ul>		

What all should know	What most should know	What some should know
<ul style="list-style-type: none"> <li>• Use correctly the vocabulary, notation and labelling conventions for lines, angles and shapes.</li> </ul>		
<ul style="list-style-type: none"> <li>• <b>Identify parallel and perpendicular lines; know the sum of angles at a point, on a straight line and in a triangle,</b> and recognise vertically opposite angles.</li> <li>• Use angle measure; distinguish between and estimate the size of acute, obtuse and reflex angles.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Identify alternate angles and corresponding angles; understand a proof that:</b> <ul style="list-style-type: none"> <li>- <b>the sum of the angles of a triangle is 180° and of a quadrilateral is 360°;</b></li> <li>- the exterior angle of a triangle is equal to the sum of the two interior opposite angles.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Explain how to find, calculate and use: <ul style="list-style-type: none"> <li>- the sums of the interior and exterior angles of quadrilaterals, pentagons and hexagons;</li> <li>- the interior and exterior angles of regular polygons.</li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>• Solve geometrical problems using side and angle properties of equilateral, isosceles and right-angled triangles and special quadrilaterals, explaining reasoning with diagrams and text; classify quadrilaterals by their geometric properties.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Solve problems using properties of angles, of parallel and intersecting lines, and of triangles and other polygons.</b></li> </ul>
<ul style="list-style-type: none"> <li>• Use a ruler and protractor to: <ul style="list-style-type: none"> <li>- measure and draw lines to the nearest millimetre and angles, including reflex angles, to the nearest degree;</li> <li>- construct a triangle given two sides and the included angle (SAS) or two angles and the included side (ASA).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Use straight edge and compasses to construct:</b> <ul style="list-style-type: none"> <li>- <b>the mid-point and perpendicular bisector of a line segment;</b></li> <li>- <b>the bisector of an angle;</b></li> <li>- <b>the perpendicular from a point to a line;</b></li> <li>- <b>the perpendicular from a point on a line.</b></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Know the definition of a circle and the names of its parts.</li> <li>• Use straight edge and compasses to construct a triangle, given right angle, hypotenuse and side (RHS).</li> </ul>
	<ul style="list-style-type: none"> <li>• Investigate in a range of contexts: shape and space.</li> </ul>	

Year 8

Autumn Term

Unit 3 Handling Data 1

6 Hours

	Core Objective	NNS	Resources	Support	Plenary	Homework
Lesson 1	Use the vocabulary of probability when interpreting the results of an experiment; appreciate that random processes are unpredictable.	Probability				
Lesson 2	As above	Probability				
Lesson 3	Know that if the probability of an event occurring is $p$ , then the probability of it not occurring is $1 - p$ ; <b>find and record all possible mutually exclusive outcomes for single events and two successive events in a systematic way</b> , using diagrams and tables.	Probability				
Lesson 4	As above	Probability				
Lesson 5	<ul style="list-style-type: none"> <li>Estimate probabilities from experimental data; understand that:               <ul style="list-style-type: none"> <li>if an experiment is repeated there may be, and usually will be, different outcomes;</li> <li>increasing the number of times an experiment is repeated generally leads to better estimates of probability.</li> </ul> </li> </ul>	Probability				
Lesson 6	As above	Probability				

Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>• Know or derive complements of 0.1, 1, 10, 50, 100, 1000.</li> <li>• Add and subtract several small numbers or several multiples of 10, e.g. <math>250 + 120 - 190</math>.</li> <li>• Use jottings to support addition and subtraction of whole numbers and decimals.</li> <li>• Calculate using knowledge of multiplication and division facts and place value, e.g. <math>432 \times 0.01</math>, <math>37 \div 0.01</math>.</li> </ul>		

What all should know	What most should know	What some should know
	<ul style="list-style-type: none"> <li>• Use the vocabulary of probability when interpreting the results of an experiment; appreciate that random processes are unpredictable.</li> </ul>	
<ul style="list-style-type: none"> <li>• <b>Understand and use the probability scale from 0 to 1; find and justify probabilities based on equally likely outcomes in simple contexts.</b></li> </ul>	<ul style="list-style-type: none"> <li>• Know that if the probability of an event occurring is <math>p</math>, then the probability of it not occurring is <math>1 - p</math>; <b>find and record all possible mutually exclusive outcomes for single events and two successive events in a systematic way, using diagrams and tables.</b></li> </ul>	<ul style="list-style-type: none"> <li>• Identify all the mutually exclusive outcomes of an experiment; <b>know that the sum of probabilities of all mutually exclusive outcomes is 1 and use this when solving problems.</b></li> </ul>
<ul style="list-style-type: none"> <li>• Collect data from a simple experiment and record in a frequency table; estimate probabilities based on this data.</li> </ul>	<ul style="list-style-type: none"> <li>• Estimate probabilities from experimental data; understand that: <ul style="list-style-type: none"> <li>- if an experiment is repeated there may be, and usually will be, different outcomes;</li> <li>- increasing the number of times an experiment is repeated generally leads to better estimates of probability.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Compare experimental and theoretical probabilities in a range of contexts; appreciate the difference between mathematical explanation and experimental evidence.</li> </ul>

**Year 8**

**Autumn Term**

**Unit 4 Number 2**

**6 Hours**

	<b>Core Objective</b>	<b>NNS</b>	<b>Resources</b>	<b>Support</b>	<b>Plenary</b>	<b>Homework</b>
<b>Lesson 1</b>	Know that a recurring decimal is a fraction; use division to convert a fraction to a decimal; order fractions by writing them with a common denominator or by converting them to decimals.	Fractions, decimals, percentages				
<b>Lesson 2</b>	Add and subtract fractions by writing them with a common denominator; calculate fractions of quantities (fraction answers); multiply and divide an integer by a fraction.	Fractions, decimals, percentages				
<b>Lesson 3</b>	Interpret percentage as the operator 'so many hundredths of' and express one given number as a percentage of another; <b>use the equivalence of fractions, decimals and percentages to compare proportions; calculate percentages and find the outcome of a given percentage increase or decrease.</b>	Fractions, decimals, percentages				
<b>Lesson 4</b>	Understand addition and subtraction of fractions; use the laws of arithmetic and inverse operations.	Calculations				
<b>Lesson 5</b>	Recall known facts, including fraction to decimal conversions; use known facts to derive unknown facts, including products such as 0.7 and 6, and 0.03 and 8.	Calculations				
<b>Lesson 6</b>	Consolidate and extend mental methods of calculation, working with decimals, fractions and percentages; solve word problems mentally.	Calculations				

Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Multiply and divide a two-digit number by a one-digit number.</li> <li>Use partitioning to multiply, e.g. <math>13 \times 1.4</math>.</li> <li>Use approximations to estimate the answers to calculations, e.g. <math>39 \times 2.8</math>.</li> </ul> <p>Solve equations, e.g. <math>3a - 2 = 31</math>.</p>		

What all should know	What most should know	What some should know
<ul style="list-style-type: none"> <li>Use fraction notation to express a smaller whole number as a fraction of a larger one; <b>simplify fractions by cancelling all common factors and identify equivalent fractions</b>; convert terminating decimals to fractions.</li> </ul>	<ul style="list-style-type: none"> <li>Know that a recurring decimal is a fraction; use division to convert a fraction to a decimal; order fractions by writing them with a common denominator or by converting them to decimals.</li> </ul>	
<ul style="list-style-type: none"> <li>Add and subtract fractions with common denominators; calculate fractions of quantities (whole-number answers); multiply a fraction by an integer.</li> </ul>	<ul style="list-style-type: none"> <li>Add and subtract fractions by writing them with a common denominator; calculate fractions of quantities (fraction answers); multiply and divide an integer by a fraction.</li> </ul>	<ul style="list-style-type: none"> <li>Use efficient methods to <b>add, subtract, multiply and divide fractions</b>, interpreting division as a multiplicative inverse; cancel common factors before multiplying or dividing.</li> </ul>
<ul style="list-style-type: none"> <li>Understand percentage as the 'number of parts per 100'; calculate simple percentages.</li> </ul>	<ul style="list-style-type: none"> <li>Interpret percentage as the operator 'so many hundredths of' and express one given number as a percentage of another; <b>use the equivalence of fractions, decimals and percentages to compare proportions; calculate percentages and find the outcome of a given percentage increase or decrease.</b></li> </ul>	<ul style="list-style-type: none"> <li>Solve problems involving percentage changes.</li> </ul>
	<ul style="list-style-type: none"> <li>Understand addition and subtraction of fractions; use the laws of arithmetic and inverse operations.</li> </ul>	
<ul style="list-style-type: none"> <li>Consolidate the rapid recall of number facts, including positive integer complements to 100 and multiplication facts to <math>10 \times 10</math>, and quickly derive associated division facts.</li> </ul>	<ul style="list-style-type: none"> <li>Recall known facts, including fraction to decimal conversions; use known facts to derive unknown facts, including products such as 0.7 and 6, and 0.03 and 8.</li> </ul>	<ul style="list-style-type: none"> <li>Use known facts to derive unknown facts.</li> </ul>
	<ul style="list-style-type: none"> <li>Consolidate and extend mental methods of calculation, working with decimals, fractions and percentages; solve word problems mentally.</li> </ul>	<ul style="list-style-type: none"> <li>Extend mental methods of calculation, working with factors, powers and roots.</li> </ul>



Year 8

Autumn Term

Unit 5

Algebra 2

6 Hours

	Core Objective	NNS	Resources	Support	Plenary	Homework
Lesson 1	Begin to distinguish the different roles played by letter symbols in equations, formulae and functions; know the meanings of the words <i>formula</i> and <i>function</i> .	Equations and formulae				
Lesson 2	Know that algebraic operations follow the same conventions and order as arithmetic operations; use index notation for small positive integer powers.	Equations and formulae				
Lesson 3	<b>Simplify or transform linear expressions by collecting like terms; multiply a single term over a bracket.</b>	Equations and formulae				
Lesson 4	As above	Equations and formulae				
Lesson 5	Use formulae from mathematics and other subjects; <b>substitute integers into simple formulae</b> , and positive integers into expressions involving small powers (e.g. $3x^2 + 4$ or $2x^3$ ); derive simple formulae.	Equations and formulae				
Lesson 6	As above	Equations and formulae				

Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Visualise, describe and sketch 2-D shapes.</li> <li>Estimate and order acute, obtuse and reflex angles.</li> <li>Use metric units (length, mass, capacity) and units of time for calculations.</li> <li>Use metric units for estimation (length, mass, capacity).</li> </ul>		

What all should know	What most should know	What some should know
<ul style="list-style-type: none"> <li><b>Use letter symbols to represent unknown numbers or variables;</b> know the meanings of the words <i>term</i>, <i>expression</i> and <i>equation</i>.</li> </ul>	<ul style="list-style-type: none"> <li>Begin to distinguish the different roles played by letter symbols in equations, formulae and functions; know the meanings of the words <i>formula</i> and <i>function</i>.</li> </ul>	
	<ul style="list-style-type: none"> <li>Know that algebraic operations follow the same conventions and order as arithmetic operations; use index notation for small positive integer powers.</li> </ul>	<ul style="list-style-type: none"> <li>Use index notation for integer powers and simple instances of the index laws.</li> </ul>
<ul style="list-style-type: none"> <li>Simplify linear algebraic expressions by collecting like terms.</li> </ul>	<ul style="list-style-type: none"> <li><b>Simplify or transform linear expressions by collecting like terms; multiply a single term over a bracket.</b></li> </ul>	<ul style="list-style-type: none"> <li>Simplify or transform algebraic expressions by taking out single term common factors.</li> </ul>
	<ul style="list-style-type: none"> <li>Use formulae from mathematics and other subjects; <b>substitute integers into simple formulae</b>, and positive integers into expressions involving small powers (e.g. <math>3x^2 + 4</math> or <math>2x^3</math>); derive simple formulae.</li> </ul>	

**Year 8****Autumn Term****Unit 6****SSM 2****6 Hours**

	<b>Core Objective</b>	<b>NNS</b>	<b>Resources</b>	<b>Support</b>	<b>Plenary</b>	<b>Homework</b>
<b>Lesson 1</b>	Use units of measurement to estimate, calculate and solve problems in everyday contexts involving length, area, volume, capacity, mass, time and angle; know rough metric equivalents of imperial measures in daily use (feet, miles, pounds, pints, gallons).	Measures and mensuration				
<b>Lesson 2</b>	<b>Deduce and use formulae for the area of a triangle, parallelogram and trapezium;</b> calculate areas of compound shapes made from rectangles and triangles.	Measures and mensuration				
<b>Lesson 3</b>	As above	Measures and mensuration				
<b>Lesson 4</b>	<b>Know and use the formula for the volume of a cuboid; calculate volumes and surface areas of cuboids</b> and shapes made from cuboids.	Measures and mensuration				
<b>Lesson 5</b>	As above	Measures and mensuration				
<b>Lesson 6</b>	Investigate in a range of contexts: measures.	Solving problems				

Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Convert between m, cm and mm, km and m, kg and g, litres and ml, cm<sup>2</sup> and mm<sup>2</sup>.</li> <li>Discuss and interpret graphs.</li> </ul> <p>Apply mental skills to solve simple problems.</p>		

What all should know	What most should know	What some should know
<ul style="list-style-type: none"> <li><b>Convert one metric unit to another</b> (e.g. grams to kilograms); <b>read and interpret scales on a range of measuring instruments.</b></li> </ul>	<ul style="list-style-type: none"> <li>Use units of measurement to estimate, calculate and solve problems in everyday contexts involving length, area, volume, capacity, mass, time and angle; know rough metric equivalents of imperial measures in daily use (feet, miles, pounds, pints, gallons).</li> </ul>	<ul style="list-style-type: none"> <li>Convert between area measures (mm<sup>2</sup> to cm<sup>2</sup>, cm<sup>2</sup> to m<sup>2</sup>, and vice versa) and between volume measures (mm<sup>3</sup> to cm<sup>3</sup>, cm<sup>3</sup> to m<sup>3</sup>, and vice versa).</li> </ul>
<ul style="list-style-type: none"> <li>Know and use the formula for the area of a rectangle; calculate the perimeter and area of shapes made from rectangles.</li> </ul>	<ul style="list-style-type: none"> <li><b>Deduce and use formulae for the area of a triangle, parallelogram</b> and trapezium; calculate areas of compound shapes made from rectangles and triangles.</li> </ul>	<ul style="list-style-type: none"> <li><b>Know and use the formulae for the circumference and area of a circle.</b></li> </ul>
<ul style="list-style-type: none"> <li>Calculate the surface area of cubes and cuboids.</li> </ul>	<ul style="list-style-type: none"> <li><b>Know and use the formula for the volume of a cuboid; calculate volumes and surface areas of cuboids</b> and shapes made from cuboids.</li> </ul>	<ul style="list-style-type: none"> <li>Calculate the surface area and volume of right prisms.</li> </ul>
	<ul style="list-style-type: none"> <li>Investigate in a range of contexts: measures.</li> </ul>	

**Year 8**

**Spring Term**

**Unit 1**

**Algebra 3**

**6 Hours**

	<b>Core Objective</b>	<b>NNS</b>	<b>Resources</b>	<b>Support</b>	<b>Plenary</b>	<b>Homework</b>
<b>Lesson 1</b>	Express simple functions in symbols; represent mappings expressed algebraically.	<b>Sequences, functions, graphs</b>				
<b>Lesson 2</b>	<ul style="list-style-type: none"> <li>Generate points in all four quadrants and <b>plot the graphs of linear functions, where y is given explicitly in terms of x</b>, on paper and using ICT; <b>recognise that equations of the form <math>y = mx + c</math> correspond to straight-line graphs.</b></li> </ul>	<b>Sequences, functions, graphs</b>				
<b>Lesson 3</b>	As above	<b>Sequences, functions, graphs</b>				
<b>Lesson 4</b>	As above	<b>Sequences, functions, graphs</b>				
<b>Lesson 5</b>	Construct linear functions arising from real-life problems and plot their corresponding graphs; discuss and interpret graphs arising from real situations.	<b>Sequences, functions, graphs</b>				
<b>Lesson 6</b>	As above	<b>Sequences, functions, graphs</b>				

Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Order, add, subtract, multiply and divide integers.</li> <li>Round numbers, including to one or two decimal places.</li> <li>Know and use squares, positive and negative square roots, cubes of numbers 1 to 5 and corresponding roots.</li> <li>Know or derive quickly prime numbers less than 30.</li> <li>Convert between improper fractions and mixed numbers.</li> </ul> <p>Find the outcome of a given percentage increase or decrease.</p>		

What all should know	What most should know	What some should know
<ul style="list-style-type: none"> <li>Express simple functions in words.</li> </ul>	<ul style="list-style-type: none"> <li>Express simple functions in symbols; represent mappings expressed algebraically.</li> </ul>	<ul style="list-style-type: none"> <li>Find the inverse of a linear function.</li> </ul>
<ul style="list-style-type: none"> <li>Generate coordinate pairs that satisfy a simple linear rule; recognise straight-line graphs parallel to the x-axis or y-axis.</li> </ul>	<ul style="list-style-type: none"> <li>Generate points in all four quadrants and <b>plot the graphs of linear functions, where y is given explicitly in terms of x</b>, on paper and using ICT; <b>recognise that equations of the form <math>y = mx + c</math> correspond to straight-line graphs.</b></li> </ul>	<ul style="list-style-type: none"> <li>Plot graphs of linear functions (<math>y</math> given implicitly in terms of <math>x</math>), e.g. <math>ay + bx = 0</math>, <math>y + bx + c = 0</math>, on paper and using ICT; <b>given values for <math>m</math> and <math>c</math>, find the gradient of lines given by equations of the form <math>y = mx + c</math>.</b></li> </ul>
	<ul style="list-style-type: none"> <li>Construct linear functions arising from real-life problems and plot their corresponding graphs; discuss and interpret graphs arising from real situations.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss and interpret distance–time graphs.</li> </ul>

**Year 8**

**Spring Term**

**Unit 2**

**Number 3**

**9 Hours**

	<b>Core Objective</b>	<b>NNS</b>	<b>Resources</b>	<b>Support</b>	<b>Plenary</b>	<b>Homework</b>
<b>Lesson 1</b>	Read and write positive integer powers of 10; multiply and divide integers and decimals by 0.1, 0.01.  Order decimals.	Place value				
<b>Lesson 2</b>	Round positive numbers to any given power of 10; round decimals to the nearest whole number or to one or two decimal places.	Place value				
<b>Lesson 3</b>	Consolidate and extend mental methods of calculation, working with decimals, squares and square roots, cubes and cube roots; solve word problems mentally.	Calculations				
<b>Lesson 4</b>	Make and justify estimates and approximations of calculations.  Consolidate standard column procedures for addition and subtraction of integers and decimals with up to two places.	Calculations				
<b>Lesson 5 and Lesson 6</b>	<b>Use standard column procedures for multiplication and division of integers and decimals, including by decimals such as 0.6 or 0.06; understand where to position the decimal point by considering equivalent calculations.</b>	Calculations				
<b>Lesson 7</b>	Check a result by considering whether it is of the right order of magnitude and by working the problem backwards	Calculations				
<b>Lesson 8</b>	Carry out more difficult calculations effectively and efficiently using the function keys of a calculator for sign change, powers, roots and fractions; use brackets and the memory.	Calculator methods				

<b>Lesson 9</b>	Enter numbers and interpret the display of a calculator in different contexts (negative numbers, fractions, decimals, percentages, money, metric measures, time).	Calculator methods				
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JAMIA SOW



Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>• Know complements of 0.1, 1, 10, 50, 100, 1000.</li> <li>• Add and subtract several small numbers or several multiples of 10, e.g. <math>250 + 120 - 190</math>.</li> <li>• Calculate using knowledge of multiplication and division facts and place value, e.g. <math>432 \times 0.01</math>, <math>37 \div 0.01</math>, <math>0.04 \times 8</math>, <math>0.03 \div 5</math>.</li> <li>• Recall multiplication and division facts to <math>10 \times 10</math>.</li> <li>• Use factors to multiply and divide mentally, e.g. <math>22 \times 0.02</math>, <math>420 \div 15</math>.</li> </ul>		

What all should know	What most should know	What some should know
<ul style="list-style-type: none"> <li>• Understand and use decimal notation and place value; multiply and divide integers and decimals by 10, 100 and 1000, and explain the effect.</li> </ul>	<ul style="list-style-type: none"> <li>• Read and write positive integer powers of 10; multiply and divide integers and decimals by 0.1, 0.01.</li> </ul>	<ul style="list-style-type: none"> <li>• Extend knowledge of integer powers of 10; multiply and divide by any integer power of 10.</li> </ul>
	<ul style="list-style-type: none"> <li>• Order decimals.</li> </ul>	
<ul style="list-style-type: none"> <li>• Round positive whole numbers to the nearest 10, 100 or 1000 and decimals to the nearest whole number or one decimal place.</li> </ul>	<ul style="list-style-type: none"> <li>• Round positive numbers to any given power of 10; round decimals to the nearest whole number or to one or two decimal places.</li> </ul>	
<ul style="list-style-type: none"> <li>• Consolidate and <b>extend mental methods of calculation to include decimals, fractions and percentages</b>, accompanied where appropriate by suitable jottings.</li> </ul>	<ul style="list-style-type: none"> <li>• Consolidate and extend mental methods of calculation, working with decimals, squares and square roots, cubes and cube roots; solve word problems mentally.</li> </ul>	<ul style="list-style-type: none"> <li>• Extend mental methods of calculation, working with decimals, fractions, percentages, factors, powers and roots.</li> </ul>
	<ul style="list-style-type: none"> <li>• Make and justify estimates and approximations of calculations.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Consolidate standard column procedures for addition and subtraction of integers and decimals with up to two places.</li> </ul>	<ul style="list-style-type: none"> <li>• Use standard column procedures to add and subtract integers and decimals of any size, including a mixture of large and small numbers with differing numbers of decimal places.</li> </ul>
<ul style="list-style-type: none"> <li>• <b>Multiply and divide three-digit by two-digit whole numbers; extend to multiplying and dividing decimals with one or two places by single-digit whole numbers.</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Use standard column procedures for multiplication and division of integers and decimals, including by decimals such as 0.6 or 0.06; understand where to position the decimal point by considering equivalent calculations.</b></li> </ul>	<ul style="list-style-type: none"> <li>• Multiply and divide by decimals, dividing by transforming to division by an integer.</li> </ul>
	<ul style="list-style-type: none"> <li>• Check a result by considering whether it is of the right order of magnitude and by working the problem backwards</li> </ul>	
<ul style="list-style-type: none"> <li>• Carry out calculations with more than one step using brackets and the memory.</li> </ul>	<ul style="list-style-type: none"> <li>• Carry out more difficult calculations effectively and efficiently using the function keys of a calculator for sign change, powers, roots and fractions; use brackets and the memory.</li> </ul>	<ul style="list-style-type: none"> <li>• Use a calculator efficiently and appropriately to perform complex calculations with numbers of any size, knowing not to round during intermediate steps of a calculation.</li> </ul>
	<ul style="list-style-type: none"> <li>• Enter numbers and interpret the display of a calculator in different contexts (negative numbers, fractions, decimals, percentages, money, metric measures, time).</li> </ul>	

Year 8

Spring Term

Unit 3

SSM3

6 Hours

	Core Objective	NNS	Resources	Support	Plenary	Homework
Lesson 1	Know that if two 2-D shapes are congruent, corresponding sides and angles are equal.	Geometrical reasoning: lines, angles and shapes				
Lesson 2	Transform 2-D shapes by simple combinations of rotations, reflections and translations, on paper and using ICT; identify all the symmetries of 2-D shapes.	Transformations				
Lesson 3	As above	Transformations				
Lesson 4	Understand and use the language and notation associated with enlargement; <b>enlarge 2-D shapes, given a centre of enlargement and a positive whole-number scale factor</b> ; explore enlargement using ICT.	Transformations				
Lesson 5	As above	Transformations				
Lesson 6	Consolidate understanding of the relationship between ratio and proportion; reduce a ratio to its simplest form, including a ratio expressed in different units, recognising links with fraction notation.	Ratio and proportion				

Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Multiply and divide a two-digit number by a one-digit number.</li> <li>Multiply by near 10s, e.g. <math>75 \times 29</math>, <math>8 \times -19</math>. Use partitioning to multiply, e.g. <math>13 \times 1.4</math>.</li> <li>Use approximations to estimate the answers to calculations, e.g. <math>39 \times 2.8</math>.</li> </ul> <p>Solve equations, e.g. <math>n(n - 1) = 56</math>.</p>		

What all should know	What most should know	What some should know
	<ul style="list-style-type: none"> <li>Know that if two 2-D shapes are congruent, corresponding sides and angles are equal.</li> </ul>	
<ul style="list-style-type: none"> <li>Recognise and visualise the transformation and symmetry of a 2-D shape: <ul style="list-style-type: none"> <li>- reflection in given mirror lines, and line symmetry;</li> <li>- rotation about a given point, and rotation symmetry;</li> <li>- translation;</li> </ul> </li> <li>explore these transformations and symmetries using ICT.</li> </ul>	<ul style="list-style-type: none"> <li>Transform 2-D shapes by simple combinations of rotations, reflections and translations, on paper and using ICT; identify all the symmetries of 2-D shapes.</li> </ul>	<ul style="list-style-type: none"> <li><b>Know that translations, rotations and reflections preserve length and angle and map objects on to congruent images;</b> identify reflection symmetry in 3-D shapes.</li> </ul>
	<ul style="list-style-type: none"> <li>Understand and use the language and notation associated with enlargement; <b>enlarge 2-D shapes, given a centre of enlargement and a positive whole-number scale factor;</b> explore enlargement using ICT.</li> </ul>	<ul style="list-style-type: none"> <li>Enlarge 2-D shapes, given a centre of enlargement and a negative whole-number scale factor, on paper; identify the scale factor of an enlargement as the ratio of the lengths of any two corresponding line segments; recognise that enlargements preserve angle but not length, and understand the implications of enlargement for perimeter.</li> </ul>
<ul style="list-style-type: none"> <li>Understand the relationship between ratio and proportion; solve simple problems about ratio and proportion using informal strategies.</li> </ul>	<ul style="list-style-type: none"> <li>Consolidate understanding of the relationship between ratio and proportion; reduce a ratio to its simplest form, including a ratio expressed in different units, recognising links with fraction notation.</li> </ul>	<ul style="list-style-type: none"> <li><b>Use proportional reasoning to solve a problem;</b> interpret and use ratio in a range of contexts.</li> </ul>

Year 8

Spring Term

Unit 4

Algebra 4

6 Hours

	Core Objective	NNS	Resources	Support	Plenary	Homework
<b>Lesson 1</b>	Begin to distinguish the different roles played by letter symbols in equations, formulae and functions; know the meanings of the words <i>formula</i> and <i>function</i> .	Equations and formulae				
<b>Lesson 2</b>	Construct and solve linear equations with integer coefficients (unknown on either or both sides, without and with brackets) using appropriate methods (e.g. inverse operations, transforming both sides in the same way).	Equations and formulae				
<b>Lesson 3</b>	As above	Equations and formulae				
<b>Lesson 4</b>	As above	Equations and formulae				
<b>Lesson 5</b>	Use formulae from mathematics and other subjects; <b>substitute integers into simple formulae</b> , including examples that lead to an equation to solve; derive simple formulae.	Equations and formulae				
<b>Lesson 6</b>	As above	Equations and formulae				

Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Visualise, describe and sketch 2-D shapes, 3-D shapes and simple loci.</li> <li>Estimate and order acute, obtuse and reflex angles.</li> <li>Use metric units (length, area and volume) and units of time for calculations.</li> <li>Use metric units for estimation (length, area and volume).</li> </ul>		

What all should know	What most should know	What some should know
<ul style="list-style-type: none"> <li><b>Use letter symbols to represent unknown numbers or variables;</b> know the meanings of the words <i>term</i>, <i>expression</i> and <i>equation</i>.</li> </ul>	<ul style="list-style-type: none"> <li>Begin to distinguish the different roles played by letter symbols in equations, formulae and functions; know the meanings of the words <i>formula</i> and <i>function</i>.</li> </ul>	
<ul style="list-style-type: none"> <li>Construct and solve simple linear equations with integer coefficients (unknown on one side only) using an appropriate method (e.g. inverse operations).</li> </ul>	<ul style="list-style-type: none"> <li>Construct and solve linear equations with integer coefficients (unknown on either or both sides, without and with brackets) using appropriate methods (e.g. inverse operations, transforming both sides in the same way).</li> </ul>	<ul style="list-style-type: none"> <li><b>Construct and solve linear equations with integer coefficients</b> (with and without brackets, negative signs anywhere in the equation, positive or negative solution), <b>using an appropriate method.</b></li> </ul>
	<ul style="list-style-type: none"> <li>Use formulae from mathematics and other subjects; <b>substitute integers into simple formulae</b>, including examples that lead to an equation to solve; derive simple formulae.</li> </ul>	<ul style="list-style-type: none"> <li>Use formulae from mathematics and other subjects; substitute numbers into expressions and formulae; derive a formula and, in simple cases, change its subject.</li> </ul>

Year 8

Spring Term

Unit 5

Handling Data 2

6 Hours

	Core Objective	NNS	Resources	Support	Plenary	Homework
<b>Lesson 1</b>	<p>Discuss a problem that can be addressed by statistical methods and identify related questions to explore.</p> <p>Decide which data to collect to answer a question, and the degree of accuracy needed; identify possible sources.</p> <p>Plan how to collect the data, including sample size; design and use two-way tables for discrete data.</p>	Handling data				
<b>Lesson 2</b>	Collect data using a suitable method, such as observation, controlled experiment using ICT, or questionnaire.	Handling data				
<b>Lesson 3</b>	Calculate statistics, including with a calculator; recognise when it is appropriate to use the range, mean, median and mode; construct and use stem-and-leaf diagrams.	Handling data				
<b>Lesson 4</b>	<p><b>Construct, on paper and using ICT:</b></p> <ul style="list-style-type: none"> <li>- pie charts for categorical data;</li> <li>- bar charts and frequency diagrams for discrete data;</li> <li>- simple scatter graphs;</li> </ul> <p><b>identify which are most useful in the context of the problem.</b></p>	Handling data				
<b>Lesson 5</b>	Interpret tables, graphs and diagrams for discrete data and draw inferences that relate to the problem being discussed; relate summarised data to the questions being explored.	Handling data				
<b>Lesson 6</b>	<p>Communicate orally and on paper the results of a statistical enquiry and the methods used, using ICT as appropriate; justify the choice of what is presented.</p> <p>Solve more complex problems by breaking them into smaller steps or tasks, choosing and using resources, including ICT.</p>	<p>Handling data</p> <p>Solving problems</p>				

Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Recall and use the formula for perimeter of rectangles and calculate areas of rectangles and triangles.</li> <li>Calculate volumes of cuboids.</li> <li>Discuss and interpret graphs.</li> </ul> <p>Apply mental skills to solve simple problems.</p>		

What all should know	What most should know	What some should know
<ul style="list-style-type: none"> <li>Given a problem that can be addressed by statistical methods, suggest possible answers.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss a problem that can be addressed by statistical methods and identify related questions to explore.</li> </ul>	
	<ul style="list-style-type: none"> <li>Decide which data to collect to answer a question, and the degree of accuracy needed; identify possible sources.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss how data relate to a problem; identify possible sources, including primary and secondary sources.</li> </ul>
<ul style="list-style-type: none"> <li>Design a data collection sheet or questionnaire to use in a simple survey; construct frequency tables for discrete data.</li> </ul>	<ul style="list-style-type: none"> <li>Plan how to collect the data, including sample size; design and use two-way tables for discrete data.</li> </ul>	
	<ul style="list-style-type: none"> <li>Collect data using a suitable method, such as observation, controlled experiment using ICT, or questionnaire.</li> </ul>	<ul style="list-style-type: none"> <li>Gather data from specified secondary sources, including printed tables and lists from ICT-based sources.</li> </ul>
<ul style="list-style-type: none"> <li>Calculate statistics for small sets of discrete data: <ul style="list-style-type: none"> <li>find the mode, median and range;</li> <li>calculate the mean, including from a simple frequency table, using a calculator for a larger number of items.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Calculate statistics, including with a calculator; recognise when it is appropriate to use the range, mean, median and mode; construct and use stem-and-leaf diagrams.</li> </ul>	
<ul style="list-style-type: none"> <li>Construct, on paper and using ICT, graphs and diagrams to represent data, including: <ul style="list-style-type: none"> <li>bar-line graphs;</li> </ul> </li> <li>use ICT to generate pie charts.</li> </ul>	<ul style="list-style-type: none"> <li><b>Construct, on paper and using ICT:</b> <ul style="list-style-type: none"> <li>pie charts for categorical data;</li> <li>bar charts and frequency diagrams for discrete data;</li> <li>simple scatter graphs;</li> </ul> </li> <li>identify which are most useful in the context of the problem.</li> </ul>	
	<ul style="list-style-type: none"> <li>Interpret tables, graphs and diagrams for discrete data and draw inferences that relate to the problem being discussed; relate summarised data to the questions being explored.</li> </ul>	<ul style="list-style-type: none"> <li>Interpret graphs and diagrams and draw inferences to support or cast doubt on initial conjectures; have a basic understanding of correlation.</li> </ul>
<ul style="list-style-type: none"> <li>Write a short report of a statistical enquiry and illustrate with appropriate diagrams, graphs and charts, using ICT as appropriate; justify choice of what is presented.</li> </ul>	<ul style="list-style-type: none"> <li>Communicate orally and on paper the results of a statistical enquiry and the methods used, using ICT as appropriate; justify the choice of what is presented.</li> </ul>	
	<ul style="list-style-type: none"> <li>Solve more complex problems by breaking them into smaller steps or tasks, choosing and using resources, including ICT.</li> </ul>	

Year 8

Summer Term

Unit 1

Number 4

6 Hours

	Core Objective	NNS	Resources	Support	Plenary	Homework
<b>Lesson 1</b>	Understand addition and subtraction of fractions and integers, and multiplication and division of integers; use the laws of arithmetic and inverse operations.  Use the order of operations, including brackets, with more complex calculations.  Consolidate and extend mental methods of calculation, working with decimals, fractions and percentages, squares and square roots, cubes and cube roots; solve word problems mentally.	Calculations				
<b>Lesson 2</b>	Make and justify estimates and approximations of calculations.  Consolidate standard column procedures for addition and subtraction of integers and decimals with up to two places.	Calculations				
<b>Lesson 3</b>	<b>Use standard column procedures for multiplication and division of integers and decimals, including by decimals such as 0.6 or 0.06; understand where to position the decimal point by considering equivalent calculations.</b>	Calculations				
<b>Lesson 4</b>	As above	Calculations				
<b>Lesson 5</b>	Check a result by considering whether it is of the right order of magnitude and by working the problem backwards.	Calculations				
<b>Lesson 6</b>	Use units of measurement to estimate, calculate and solve problems in everyday contexts.	Measures				



Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Order, add, subtract, multiply and divide integers.</li> <li>Multiply and divide decimals by 10, 100, 1000, 0.1, 0.01.</li> <li>Round numbers, including to one or two decimal places.</li> <li>Know and use squares, cubes, roots and index notation. Know or derive prime factorisation of numbers to 30.</li> </ul>		

What all should know	What most should know	What some should know
	<ul style="list-style-type: none"> <li>Understand addition and subtraction of fractions and integers, and multiplication and division of integers; use the laws of arithmetic and inverse operations.</li> </ul>	<ul style="list-style-type: none"> <li><b>Understand the effects of multiplying and dividing by numbers between 0 and 1.</b></li> </ul>
	<ul style="list-style-type: none"> <li>Use the order of operations, including brackets, with more complex calculations.</li> </ul>	<ul style="list-style-type: none"> <li>Understand the order of precedence and effect of powers.</li> </ul>
<ul style="list-style-type: none"> <li>Consolidate and <b>extend mental methods of calculation to include decimals, fractions and percentages</b>, accompanied where appropriate by suitable jottings.</li> </ul>	<ul style="list-style-type: none"> <li>Consolidate and extend mental methods of calculation, working with decimals, fractions and percentages, squares and square roots, cubes and cube roots; solve word problems mentally.</li> </ul>	<ul style="list-style-type: none"> <li>Extend mental methods of calculation, working with decimals, fractions, percentages, factors, powers and roots.</li> </ul>
	<ul style="list-style-type: none"> <li>Make and justify estimates and approximations of calculations.</li> </ul>	
	<ul style="list-style-type: none"> <li>Consolidate standard column procedures for addition and subtraction of integers and decimals with up to two places.</li> </ul>	<ul style="list-style-type: none"> <li>Use standard column procedures to add and subtract integers and decimals of any size.</li> </ul>
<ul style="list-style-type: none"> <li><b>Multiply and divide three-digit by two-digit whole numbers; extend to multiplying and dividing decimals with one or two places by single-digit whole numbers.</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Use standard column procedures for multiplication and division of integers and decimals, including by decimals such as 0.6 or 0.06; understand where to position the decimal point by considering equivalent calculations.</b></li> </ul>	<ul style="list-style-type: none"> <li>Multiply and divide by decimals, dividing by transforming to division by an integer.</li> </ul>
	<ul style="list-style-type: none"> <li>Check a result by considering whether it is of the right order of magnitude and by working the problem backwards.</li> </ul>	
<ul style="list-style-type: none"> <li><b>Convert one metric unit to another</b> (e.g. grams to kilograms).</li> </ul>	<ul style="list-style-type: none"> <li>Use units of measurement to estimate, calculate and solve problems in everyday contexts.</li> </ul>	

Year 8

Summer Term

Unit 2

Algebra 5

8 Hours

	<b>Core Objective</b>	<b>NNS</b>	<b>Resources</b>	<b>Support</b>	<b>Plenary</b>	<b>Homework</b>
<b>Lesson 1</b>	<b>Simplify or transform linear expressions by collecting like terms; multiply a single term over a bracket.</b>	Equations and formulae				
<b>Lesson 2</b>	Construct and solve linear equations with integer coefficients (unknown on either or both sides, without and with brackets) using appropriate methods (e.g. inverse operations, transforming both sides in the same way).	Equations and formulae				
<b>Lesson 3</b>	As above	Equations and formulae				
<b>Lesson 4</b>	Begin to use graphs and set up equations to solve simple problems involving direct proportion.	Equations and formulae				
<b>Lesson 5</b>	<b>Plot the graphs of linear functions, where <math>y</math> is given explicitly in terms of <math>x</math>, on paper and using ICT.</b>	Sequences, functions and graphs				
<b>Lesson 6</b>	Construct linear functions arising from real-life problems and plot their corresponding graphs; discuss and interpret graphs arising from real situations.	Sequences, functions and graphs				
<b>Lesson 7</b>	Solve more demanding problems and investigate in a range of contexts: algebra.	Solving problems				

<b>Lesson 8</b>	Solve more complex problems by breaking them into smaller steps or tasks, choosing and using efficient techniques for algebraic manipulation.	Solving problems				
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Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Convert between fractions, decimals and percentages.</li> <li>Find the outcome of a given percentage increase or decrease.</li> <li>Know complements of 0.1, 1, 10, 50, 100.</li> <li>Add and subtract several small numbers or several multiples of 10, e.g. <math>250 + 120 - 190</math>.</li> <li>Use jottings to support addition and subtraction of whole numbers and decimals.</li> </ul>		

What all should know	What most should know	What some should know
<ul style="list-style-type: none"> <li>Simplify linear algebraic expressions by collecting like terms.</li> <li>Construct and solve simple linear equations with integer coefficients (unknown on one side only) using an appropriate method (e.g. inverse operations).</li> </ul>	<ul style="list-style-type: none"> <li><b>Simplify or transform linear expressions by collecting like terms; multiply a single term over a bracket.</b></li> <li>Construct and solve linear equations with integer coefficients (unknown on either or both sides, without and with brackets) using appropriate methods (e.g. inverse operations, transforming both sides in the same way).</li> </ul>	<ul style="list-style-type: none"> <li>Simplify or transform algebraic expressions by taking out single term common factors.</li> <li><b>Construct and solve linear equations with integer coefficients</b> (with and without brackets, negative signs anywhere in the equation, positive or negative solution), <b>using an appropriate method.</b></li> </ul>
		<ul style="list-style-type: none"> <li>Use systematic trial and improvement methods and ICT tools to find approximate solutions of equations such as <math>x^3 + x = 20</math>.</li> </ul>
	<ul style="list-style-type: none"> <li>Begin to use graphs and set up equations to solve simple problems involving direct proportion.</li> </ul>	<ul style="list-style-type: none"> <li>Solve problems involving direct proportion using algebraic methods, relating algebraic solutions to graphical representations of the equations; use ICT as appropriate.</li> </ul>
<ul style="list-style-type: none"> <li>Generate coordinate pairs that satisfy a simple linear rule; recognise straight-line graphs parallel to the x-axis or y-axis.</li> </ul>	<ul style="list-style-type: none"> <li><b>Plot the graphs of linear functions, where y is given explicitly in terms of x</b>, on paper and using ICT.</li> </ul>	<ul style="list-style-type: none"> <li>Plot graphs of linear functions (<math>y</math> given implicitly in terms of <math>x</math>), e.g. <math>ay + bx = 0</math>, <math>y + bx + c = 0</math>, on paper and using ICT.</li> </ul>
	<ul style="list-style-type: none"> <li>Construct linear functions arising from real-life problems and plot their corresponding graphs; discuss and interpret graphs arising from real situations.</li> </ul>	
	<ul style="list-style-type: none"> <li>Solve more demanding problems and investigate in a range of contexts: algebra.</li> </ul>	
<ul style="list-style-type: none"> <li><b>Break a complex calculation into simpler steps, choosing and using appropriate and efficient operations, methods</b> and resources, including ICT.</li> </ul>	<ul style="list-style-type: none"> <li>Solve more complex problems by breaking them into smaller steps or tasks, choosing and using efficient techniques for algebraic manipulation.</li> </ul>	<ul style="list-style-type: none"> <li>Use trial and improvement methods where a more efficient method is not obvious.</li> </ul>

Year 8

Summer Term

Unit 3

Solving Problems

6 Hours

	Core Objective	NNS	Resources	Support	Plenary	Homework
Lesson 1	Solve more demanding problems and investigate in a range of contexts: number and measures.	Solving problems				
Lesson 2	Identify the necessary information to solve a problem; represent problems and interpret solutions in algebraic or graphical form, using correct notation.	Solving problems				
Lesson 3	Solve more complex problems by breaking them into smaller steps or tasks, choosing and using efficient techniques for calculation.	Solving problems				
Lesson 4	Use logical argument to establish the truth of a statement; give solutions to an appropriate degree of accuracy in the context of the problem.	Solving problems				
Lesson 5	Suggest extensions to problems, conjecture and generalise; identify exceptional cases or counter-examples.	Solving problems				
Lesson 6	Consolidate understanding of the relationship between ratio and proportion; reduce a ratio to its simplest form, including a ratio expressed in different units, recognising links with fraction notation; <b>divide a quantity into two or more parts in a given ratio; use the unitary method to solve simple word problems involving ratio and direct proportion.</b>	Ratio and proportion				

Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Calculate using knowledge of multiplication and division facts and place value, e.g. <math>432 \times 0.01</math>, <math>37 \div 0.01</math>, <math>0.04 \times 8</math>, <math>0.03 \div 5</math>.</li> <li>Recall multiplication and division facts to <math>10 \times 10</math>.</li> <li>Use factors to multiply and divide mentally, e.g. <math>22 \times 0.02</math>, <math>420 \div 15</math>. Multiply by near 10s, e.g. <math>75 \times 29</math>, <math>8 \times 19</math>.</li> </ul>		

What all should know	What most should know	What some should know
	<ul style="list-style-type: none"> <li>Solve more demanding problems and investigate in a range of contexts: number and measures.</li> </ul>	
<ul style="list-style-type: none"> <li>Represent problems mathematically, making correct use of symbols, words, diagrams, tables and graphs.</li> </ul>	<ul style="list-style-type: none"> <li><b>Identify the necessary information to solve a problem; represent problems and interpret solutions in algebraic or graphical form, using correct notation.</b></li> </ul>	
<ul style="list-style-type: none"> <li><b>Break a complex calculation into simpler steps, choosing and using appropriate and efficient operations, methods and resources, including ICT.</b></li> </ul>	<ul style="list-style-type: none"> <li>Solve more complex problems by breaking them into smaller steps or tasks, choosing and using efficient techniques for calculation.</li> </ul>	<ul style="list-style-type: none"> <li>Solve increasingly demanding problems and evaluate solutions; explore connections in mathematics across a range of contexts.</li> </ul>
	<ul style="list-style-type: none"> <li><b>Use logical argument to establish the truth of a statement;</b> give solutions to an appropriate degree of accuracy in the context of the problem.</li> </ul>	<ul style="list-style-type: none"> <li><b>Present a concise, reasoned argument, using symbols, diagrams and graphs and related explanatory text.</b></li> </ul>
<ul style="list-style-type: none"> <li>Understand the significance of a counter-example.</li> </ul>	<ul style="list-style-type: none"> <li>Suggest extensions to problems, conjecture and generalise; identify exceptional cases or counter-examples.</li> </ul>	
<ul style="list-style-type: none"> <li>Understand the relationship between ratio and proportion; solve simple problems about ratio and proportion using informal strategies.</li> </ul>	<ul style="list-style-type: none"> <li>Consolidate understanding of the relationship between ratio and proportion; reduce a ratio to its simplest form, including a ratio expressed in different units, recognising links with fraction notation; <b>divide a quantity into two or more parts in a given ratio; use the unitary method to solve simple word problems involving ratio and direct proportion.</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Use proportional reasoning to solve a problem, choosing the correct numbers to take as 100%, or as a whole;</b> compare two ratios; interpret and use ratio in a range of contexts, including solving word problems.</li> </ul>

Year 8

Summer Term

Unit 4

SSM 4

9 Hours

	Core Objective	NNS	Resources	Support	Plenary	Homework
Lesson 1	Know and use geometric properties of cuboids and shapes made from cuboids; begin to use plans and elevations.	Geometrical reasoning: lines, angles and shapes				
Lesson 2	Make simple scale drawings.	Transformations				
Lesson 3	Given the coordinates of points A and B, find the mid-point of the line segment AB.	Coordinates				
Lesson 4 and Lesson 5	<ul style="list-style-type: none"><li>Use straight edge and compasses to construct:<ul style="list-style-type: none"><li>- a triangle, given three sides (SSS); use ICT to explore this construction.</li></ul></li></ul>	Construction and loci				
Lesson 6	Find simple loci, both by reasoning and by using ICT, to produce shapes and paths, e.g. an equilateral triangle.	Construction and loci				
Lesson 7	Use bearings to specify direction.	Mensuration				
Lesson 8 and Lesson 9	Know and use the formula for the volume of a cuboid; calculate volumes and surface areas of cuboids and shapes made from cuboids.	Mensuration				

Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Use partitioning to multiply, e.g. <math>13 \times 1.4</math>.</li> <li>Use approximations to estimate the answers to calculations, e.g. <math>39 \times 2.8</math>.</li> <li>Solve equations, e.g. <math>n(n - 1) = 56</math>, <math>\square + \square = -46</math>.</li> <li>Visualise, describe and sketch 2-D shapes, 3-D shapes and simple loci.</li> <li>Estimate and order acute, obtuse and reflex angles.</li> </ul>		

What all should know	What most should know	What some should know
<ul style="list-style-type: none"> <li>Use 2-D representations to visualise 3-D shapes and deduce some of their properties.</li> </ul>		
<ul style="list-style-type: none"> <li>Use ruler and protractor to construct simple nets of 3-D shapes, e.g. cuboid, regular tetrahedron, square-based pyramid, triangular prism.</li> </ul>	<ul style="list-style-type: none"> <li>Know and use geometric properties of cuboids and shapes made from cuboids; begin to use plans and elevations.</li> </ul>	<ul style="list-style-type: none"> <li>Visualise and use 2-D representations of 3-D objects; analyse 3-D shapes through 2-D projections, including plans and elevations.</li> </ul>
	<ul style="list-style-type: none"> <li>Make simple scale drawings.</li> </ul>	<ul style="list-style-type: none"> <li>Use and interpret maps, scale drawings.</li> </ul>
<ul style="list-style-type: none"> <li>Use conventions and notation for 2-D coordinates in all four quadrants; find coordinates of points determined by geometric information.</li> </ul>	<ul style="list-style-type: none"> <li>Given the coordinates of points A and B, find the mid-point of the line segment AB.</li> </ul>	
<ul style="list-style-type: none"> <li>Use a ruler and protractor to: <ul style="list-style-type: none"> <li>measure and draw lines to the nearest millimetre and angles, including reflex angles, to the nearest degree;</li> <li>construct a triangle given two sides and the included angle (SAS) or two angles and the included side (ASA);</li> </ul> </li> <li>explore these constructions using ICT.</li> </ul>	<ul style="list-style-type: none"> <li><b>Use straight edge and compasses to construct:</b> <ul style="list-style-type: none"> <li>a triangle, given three sides (SSS);</li> </ul> </li> <li>use ICT to explore this construction.</li> </ul>	<ul style="list-style-type: none"> <li>Use straight edge and compasses to construct a triangle, given right angle, hypotenuse and side (RHS).</li> </ul>
	<ul style="list-style-type: none"> <li>Find simple loci, both by reasoning and by using ICT, to produce shapes and paths, e.g. an equilateral triangle.</li> <li>Use bearings to specify direction.</li> </ul>	
<ul style="list-style-type: none"> <li>Calculate the surface area of cubes and cuboids.</li> </ul>	<ul style="list-style-type: none"> <li><b>Know and use the formula for the volume of a cuboid; calculate volumes and surface areas of cuboids and shapes made from cuboids.</b></li> </ul>	<ul style="list-style-type: none"> <li>Calculate the surface area and volume of right prisms.</li> </ul>



**Year 8**

**Summer Term**

**Unit 5**

**Handling Data 3**

**7 Hours**

	<b>Core Objective</b>	<b>NNS</b>	<b>Resources</b>	<b>Support</b>	<b>Plenary</b>	<b>Homework</b>
<b>Lesson 1</b>	<p>Discuss a problem that can be addressed by statistical methods and identify related questions to explore.</p> <p>Decide which data to collect to answer a question, and the degree of accuracy needed; identify possible sources.</p> <p>Plan how to collect the data, including sample size; construct frequency tables with given equal class intervals for sets of continuous data.</p>	Handling data				
<b>Lesson 2</b>	<p>Collect data using a suitable method, such as observation, controlled experiment, including data logging using ICT, or questionnaire.</p>	Handling data				
<b>Lesson 3 and Lesson 4</b>	<p><b>Construct, on paper and using ICT: bar charts and frequency diagrams for continuous data; simple line graphs for time series; identify which are most useful in the context of the problem.</b></p> <p>Interpret tables, graphs and diagrams for continuous data and draw inferences that relate to the problem being discussed; relate summarised data to the questions being explored.</p>	Handling data				
<b>Lesson 5</b>	<p>Compare two distributions using the range and one or more of the mode, median and mean.</p> <p>Communicate orally and on paper the results of a statistical enquiry and the methods used, using ICT as appropriate; justify the choice of what is presented.</p>	Handling data				
<b>Lesson 6</b>	<p>Compare experimental and theoretical probabilities in different contexts.</p>	Probability				

<b>Lesson 7</b>	Solve more complex problems by breaking them into smaller steps or tasks, choosing and using graphical representation, and also resources, including ICT.	Solving problems				
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Starters	ICT	Keywords
<ul style="list-style-type: none"> <li>Use metric units (length, mass, capacity, area and volume) and units of time for calculations.</li> <li>Use metric units for estimation (length, mass, capacity, area and volume).</li> <li>Convert between m, cm and mm, km and m, kg and g, litres and ml, cm<sup>2</sup> and mm<sup>2</sup>.</li> <li>Discuss and interpret graphs.</li> <li>Calculate a mean using an assumed mean.</li> </ul> <p>Apply mental skills to solve simple problems.</p>		

What all should know	What most should know	What some should know
<ul style="list-style-type: none"> <li>Given a problem that can be addressed by statistical methods, suggest possible answers.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss a problem that can be addressed by statistical methods and identify related questions to explore.</li> </ul>	
	<ul style="list-style-type: none"> <li>Decide which data to collect to answer a question, and the degree of accuracy needed; identify possible sources.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss how data relate to a problem; identify possible sources, including primary and secondary sources.</li> </ul>
<ul style="list-style-type: none"> <li>Design a data collection sheet or questionnaire to use in a simple survey; construct frequency tables for discrete data, grouped where appropriate in equal class intervals.</li> </ul>	<ul style="list-style-type: none"> <li>Plan how to collect the data, including sample size; construct frequency tables with given equal class intervals for sets of continuous data.</li> </ul>	<ul style="list-style-type: none"> <li><b>Design a survey or experiment to capture the necessary data from one or more sources; determine the sample size and degree of accuracy needed; design, trial and if necessary refine data collection sheets;</b> construct tables for large discrete and continuous sets of raw data, choosing suitable class intervals.</li> </ul>
	<ul style="list-style-type: none"> <li>Collect data using a suitable method, such as observation, controlled experiment, including data logging using ICT, or questionnaire.</li> </ul>	
<ul style="list-style-type: none"> <li>Calculate statistics for small sets of discrete data: <ul style="list-style-type: none"> <li>find the mode, median and range, and the modal class for grouped data;</li> <li>calculate the mean, including from a simple frequency table, using a calculator for a larger number of items.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Calculate statistics, including with a calculator; calculate a mean using an assumed mean; know when it is appropriate to use the modal class for grouped data.</li> </ul>	
<ul style="list-style-type: none"> <li>Construct, on paper and using ICT, graphs and diagrams to represent data, including: <ul style="list-style-type: none"> <li>frequency diagrams for grouped discrete data;</li> <li>use ICT to generate pie charts.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><b>Construct, on paper and using ICT:</b> <ul style="list-style-type: none"> <li>- bar charts and frequency diagrams for continuous data;</li> <li>- simple line graphs for time series;</li> </ul> </li> <li>identify which are most useful in the context of the problem.</li> </ul>	
	<ul style="list-style-type: none"> <li>Interpret tables, graphs and diagrams for continuous data and draw inferences that relate to the problem being discussed; relate summarised data to the questions being explored.</li> </ul>	
	<ul style="list-style-type: none"> <li>Compare two distributions using the range and one or more of the mode, median and mean.</li> </ul>	<ul style="list-style-type: none"> <li>Compare two or more distributions and make inferences, using the shape of the distributions, the range of data and appropriate statistics.</li> </ul>
<ul style="list-style-type: none"> <li>Write a short report of a statistical enquiry and illustrate with appropriate diagrams, graphs and charts, using ICT as appropriate; justify choice of what is presented.</li> </ul>	<ul style="list-style-type: none"> <li>Communicate orally and on paper the results of a statistical enquiry and the methods used, using ICT as appropriate; justify the choice of what is presented.</li> </ul>	
	<ul style="list-style-type: none"> <li>Compare experimental and theoretical probabilities in different contexts.</li> </ul>	<ul style="list-style-type: none"> <li>Appreciate the difference between mathematical explanation and experimental evidence.</li> </ul>

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|  | <ul style="list-style-type: none"><li>• Solve more complex problems by breaking them into smaller steps or tasks, choosing and using graphical representation, and also resources, including ICT.</li></ul> |  |
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