



# Fairlands Middle School

We Collaborate, Achieve & Belong

## Curriculum Progression Map

### Subject: Maths

Year 5	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	<b>Number &amp; Place Value</b>	<b>Number Facts &amp; <math>\times/\div</math>:</b>	<b>Geometry &amp; Multiplication &amp; Division</b>	<b>Multiplication &amp; Division</b>	<b>Fractions</b>	<b>Number &amp; Place Value &amp; Geometry</b>
Knowledge	Decimal fractions  Money	Negative numbers  Short multiplication and division	Area and scaling  Calculations with decimal fractions	Factors, multiples, primes & volume	Add, subtract & multiply fractions.  Find fractions of amounts, equivalence, and FD equivalence	Converting units  Angles
Skills	<b>Decimal Fractions</b> <ul style="list-style-type: none"> <li>identify tenths as part of a whole.</li> <li>describe and represent tenths as a decimal fraction</li> <li>count in tenths in different ways</li> <li>describe and write decimal numbers with tenths in different ways</li> <li>compare and order decimal numbers with tenths</li> <li>explain that decimal numbers with tenths</li> </ul>	<b>Negative Numbers</b> <ul style="list-style-type: none"> <li>represent a change story using addition and subtraction symbols</li> <li>interpret numbers greater than and less than zero in different contexts</li> <li>read and write negative numbers</li> <li>explain how the value of a number relates to its position from zero</li> <li>identify and place negative numbers on a number line</li> </ul>	<b>Area and scaling</b> <ul style="list-style-type: none"> <li>explain what area is and can measure using counting as a strategy (I)</li> <li>explain what area is and can measure using counting as a strategy (II)</li> <li>explain how to make different shapes with the same area</li> <li>explain how to compare the area of different shapes</li> </ul>	<b>Factors, multiples, primes &amp; volume</b> <ul style="list-style-type: none"> <li>explain what 'volume' is using a range of contexts</li> <li>describe the units used to measure volume</li> <li>explain how to calculate the volume of a cuboid</li> <li>explain what a cube number is</li> <li>use their knowledge of calculating volume to solve problems in a range of contexts</li> </ul>	<b>+ - x Fractions</b> <ul style="list-style-type: none"> <li>explain the relationship between repeated addition of a proper fraction and multiplication of fractions (unit fractions)</li> <li>explain the relationship between repeated addition of a proper fraction and multiplication of fractions (non-unit fractions)</li> </ul>	<b>Converting units</b> <ul style="list-style-type: none"> <li>apply memorised unit conversions to convert between units of measure (larger to smaller units - whole number conversions)</li> <li>apply memorised unit conversions to convert between units of measure (smaller to larger units -</li> </ul>

	<p>can be composed additively</p> <ul style="list-style-type: none"> <li>describe and represent hundredths as a decimal fraction</li> <li>describe and write decimals numbers with hundredths in different ways</li> <li>compare and order decimal numbers with hundredths</li> <li>explain that decimal numbers with hundredths can be partitioned in different ways</li> <li>use their knowledge of decimal place value to convert between and compare metres and centimetres</li> <li>explain that different lengths can be composed additively and multiplicatively</li> <li>use their knowledge of decimal place value to solve problems in different contexts.</li> <li>use their knowledge to calculate with decimal numbers up to and bridging one tenth.</li> <li>use their knowledge to calculate with decimal numbers using column addition and subtraction.</li> <li>round a decimal number with hundredths to the nearest tenth</li> </ul>	<ul style="list-style-type: none"> <li>interpret sets of negative and positive numbers in a range of contexts</li> <li>use their knowledge of positive and negative numbers to calculate intervals</li> <li>explain how negative numbers are used on a coordinate grid</li> <li>use their knowledge of positive and negative numbers to interpret graphs</li> </ul> <p><b>Short multiplication and division</b></p> <ul style="list-style-type: none"> <li>multiply a two-digit number by a single-digit number using partitioning and representations (no regroup)</li> <li>multiply a two-digit number by a single-digit number using partitioning and representations (one regroup)</li> <li>multiply a two-digit number by a single-digit number using partitioning and representations (two regroup)</li> <li>multiply a two-digit number by a single-digit number using partitioning and representations (no regroup)</li> <li>multiply a two-digit number by a single-digit number using short multiplication (no regroup)</li> </ul>	<ul style="list-style-type: none"> <li>measure the area of flat shapes area using square centimetres</li> <li>measure the area of flat shapes area using square metres</li> <li>calculate the area of a rectangle using multiplication</li> <li>calculate the area of rectilinear shapes</li> <li>use their knowledge of area to solve problems</li> <li>compare and describe lengths by using their knowledge of multiplication</li> <li>use their knowledge of multiplication to solve comparison and change problems</li> <li>compare and describe lengths by using their knowledge of division</li> <li>use their knowledge of division to solve comparison and change problems</li> <li>compare and describe measurements by using their knowledge of multiplication and division (mass/capacity/time) (l)</li> <li>compare and describe measurements by using their knowledge of multiplication and division</li> </ul>	<ul style="list-style-type: none"> <li>explain how to calculate the volume of compound shapes</li> <li>explain the use of the commutative and distributive laws when multiplying three or more numbers</li> <li>explain the reasons for changing two-factor multiplication calculations to three-factor multiplications</li> <li>explain what a factor is and how to use arrays and multiplication/division facts to find them</li> <li>explain how to systematically find all factors of a number and how they know when they have found them all</li> <li>use a complete list of factors to explain when a number is a square number</li> <li>explain how to identify a prime number or a composite number</li> <li>explain how to identify a common factor or a prime factor of a number</li> <li>explain how to identify a multiple or common multiple of a number</li> <li>use knowledge of properties of number to solve problems in a range of contexts</li> </ul>	<ul style="list-style-type: none"> <li>multiply a proper fraction by a whole number (within a whole)</li> <li>multiply a proper fraction by a whole number (greater than a whole)</li> <li>multiply an improper fraction by a whole number</li> <li>multiply a mixed number by a whole number (product is within a whole)</li> <li>multiply a mixed number by a whole number (product is greater than a whole)</li> </ul> <p><b>Find fractions of amounts, equivalence, and FD equivalence</b></p> <ul style="list-style-type: none"> <li>find a unit fraction of a quantity</li> <li>explain the relationship between finding a fraction of a quantity and multiplying a whole number by a unit fraction</li> <li>explain the relationship between dividing by a whole number and multiplying a whole number by a unit fraction</li> <li>use their knowledge of multiplying a whole number by a unit fraction to solve problems</li> </ul>	<p>whole number conversions)</p> <ul style="list-style-type: none"> <li>convert from and to fraction and decimal fraction quantities of larger units</li> <li>derive common conversions over 1</li> <li>carry out conversions that correspond to 100 parts</li> <li>solve measures problems involving different units</li> <li>understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints</li> <li>convert between miles and kilometres</li> <li>solve problems involving converting between units of time</li> </ul> <p><b>Angles</b></p> <ul style="list-style-type: none"> <li>compare the size of angles where there is a clear visual difference</li> </ul>
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	<ul style="list-style-type: none"> <li>round a decimal number with hundredths to the nearest whole number</li> <li>read and write numbers with up to three decimal places.</li> <li>compare and order numbers with up to three decimal places</li> </ul> <p><b>Money</b></p> <ul style="list-style-type: none"> <li>explain and represent whole pounds as a quantity of money</li> <li>explain and represent whole pounds and pence as a quantity of money</li> <li>explain how to compare amounts of money</li> <li>convert quantities of money between pounds and pence</li> <li>use their knowledge of addition to efficiently add commonly used prices</li> <li>use their knowledge of subtraction to calculate the change due when paying whole pounds or notes</li> <li>use and explain the most efficient strategies when adding quantities of money</li> <li>use and explain the most efficient strategies when subtracting quantities of money</li> </ul>	<ul style="list-style-type: none"> <li>multiply a two-digit number by a single-digit number using expanded multiplication (regrouping ones to tens)</li> <li>multiply a two-digit number by a single-digit number using short multiplication (regrouping ones to tens)</li> <li>multiply a two-digit number by a single-digit number using expanded multiplication (regrouping tens to hundreds)</li> <li>multiply a two-digit number by a single-digit number using short multiplication (regrouping tens to hundreds)</li> <li>multiply a two-digit number by a single-digit number using both expanded and short multiplication (two regroups)</li> <li>use estimation to support accurate calculation</li> <li>multiply a three-digit number by a single-digit number using partitioning and representations</li> <li>multiply a three-digit number by a single-digit number using partitioning</li> <li>multiply a three-digit number by a single-digit number using expanded and short multiplication (no regroups)</li> <li>multiply a three-digit number by a single-digit number using expanded</li> </ul>	<p>(mass/capacity/time) (II)</p> <ul style="list-style-type: none"> <li>describe the changes in measurements using their knowledge of multiplication and division</li> <li>use their knowledge of multiplication and division to solve comparison and change problems</li> </ul> <p><b>Calculating with decimal fractions</b></p> <ul style="list-style-type: none"> <li>explain the effect of multiplying and dividing a number by 10, 100 and 1,000 (1)</li> <li>explain the effect of multiplying and dividing a number by 10, 100 and 1,000 (2)</li> <li>explain how to multiply and divide a number by 10, 100 and 1,000 (first 'number' two or more non-zero digits)</li> <li>use their knowledge of multiplication and division by 10/100/1,000 to convert between units of measure (length)</li> <li>use their knowledge of multiplication and division by 10/100/1,000 to convert between units of measure (mass and capacity)</li> </ul>	<ul style="list-style-type: none"> <li>explain how to use the factor pairs of '100' to solve calculations efficiently</li> </ul>	<ul style="list-style-type: none"> <li>find a non-unit fraction of a quantity (mental calculation)</li> <li>find a non-unit fraction of a quantity (written calculation)</li> <li>multiply a whole number by a proper fraction</li> <li>explain when a calculation represents scaling down and when it represents repeated addition</li> <li>find the whole when the size of a unit fraction is known</li> <li>find a unit fraction when the size of a non-unit fraction is known</li> <li>find the whole when the size of a non-unit fraction is known</li> <li>find the unit fraction when the size of a non-unit fraction is known</li> <li>use representations to describe and compare two fractions (1/4 and 3/12)</li> <li>explain the horizontal relationship between numerators and denominators across equivalent fractions (1/5, 1/3 and equivalent)</li> <li>explain the relationship within families of equivalent fractions</li> </ul>	<ul style="list-style-type: none"> <li>use the terms acute, obtuse and reflex when describing the size of angles or amount of rotation with relation to right angles</li> <li>use a unit called degrees (°) as a standard unit to measure angles</li> <li>estimate the size of angles in degrees using angle sets</li> <li>measure the size of angles accurately using a protractor</li> </ul>
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	<ul style="list-style-type: none"> <li>• find the change when purchasing several items</li> <li>• use the most efficient and reliable strategy to find the change when purchasing several items</li> </ul>	<p>and short multiplication (one regroup)</p> <ul style="list-style-type: none"> <li>• multiply a three-digit number by a single-digit number using expanded and short multiplication (multiple regroupings)</li> <li>• use estimation to support accurate calculation</li> <li>• divide a two-digit number by a single-digit number using partitioning and representations (no remainders, no exchanging)</li> <li>• divide a two-digit number by a single-digit number using partitioning and representations (with exchanging)</li> <li>• divide a two-digit number by a single-digit number using partitioning and representations (with exchanging and remainders)</li> <li>• divide a two-digit number by a single-digit number using short division (no exchanging, no remainders)</li> <li>• divide a two-digit number by a single-digit number using short division (with exchanging)</li> <li>• divide a two-digit number by a single-digit number using short division (with exchanging and remainders)</li> <li>• divide a three-digit number by a single-digit number using partitioning and representations (no</li> </ul>	<ul style="list-style-type: none"> <li>• explain how to use known multiplication facts and unitising to multiply decimal fractions by whole numbers (tenths)</li> <li>• explain how to use known multiplication facts and unitising to multiply decimal fractions by whole numbers (hundredths)</li> <li>• use their knowledge of multiplying decimal fractions by whole numbers to solve measures problems</li> <li>• explain the relationship between multiplying by 0.1 dividing by 10</li> <li>• explain the relationship between multiplying by 0.01 dividing by 100</li> <li>• explain how to use multiplying by 10 or 100 to multiply one-digit numbers by decimal fractions (1)</li> <li>• explain how to use multiplying by 10 or 100 to multiply one-digit numbers by decimal fractions (2)</li> <li>• explain how to use the size of the multiplier to predict the size of the product compared to the multiplicand</li> <li>• explain how to use multiplying by 10 or 100 to divide decimal</li> </ul>		<ul style="list-style-type: none"> <li>• use their knowledge of equivalent fractions to solve problems</li> <li>• explain and represent how to divide 1 into different amounts of equal parts</li> <li>• identify and describe patterns within the number system</li> <li>• use their knowledge of common equivalents to compare fractions with decimals</li> <li>• practise recalling common fraction-decimal equivalents</li> <li>• use their knowledge of common fraction-decimal equivalents to solve conversion problems in a range of contexts</li> <li>• use their knowledge of common equivalents to compare fractions with decimals beyond one</li> <li>• use their knowledge of simplifying calculations by substitution to solve problems in a range of contexts</li> </ul>	
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		<p>exchanging, no remainders)</p> <ul style="list-style-type: none"> <li>• divide a three-digit number by a single-digit number using partitioning and representations (one exchange, no remainders)</li> <li>• divide a three-digit number by a single-digit number using partitioning and representations (with exchanging and remainders)</li> <li>• divide a three-digit number by a single-digit number using short division</li> <li>• divide a three-digit number by a single-digit number using short division (with exchanging and remainders)</li> <li>• solve short division problems accurately when the hundreds digit is smaller than the divisor</li> <li>• will use efficient strategies of division to solve problems</li> </ul>	<p>fractions by one-digit numbers (1)</p> <ul style="list-style-type: none"> <li>• explain how to use multiplying by 10 or 100 to divide decimal fractions by one-digit numbers (2)</li> </ul>			
Key Vocabulary/reading opportunities	<p>Integer: meaning intact  Centimetre: Centi – meaning part of a hundred, metre – meaning Measure: ascertain a dimension by comparison with a standard</p>	<p>Hundredth: being of 100 equal parts  Negative: absence of positive  Multiply: multi – many; ply – layers</p>	<p>Compare: Com – with, together; par - equal</p>	<p>Fraction: a fragment or broken off piece</p>	<p>Equivalence: the same; equal; like</p>	<p>Estimate: Form an approximate notion  Measure:</p>
Stretch and Challenge	<p>Use of thousandths and beyond, whilst maintaining context</p>	<p>Shopping list – start with an amount – what can I buy – exchanging over multiple columns</p>	<p>Formal long multiplication/Division by 2 digits</p>	<p>Find common factors of pairs (or triples) of numbers   List primes to 100</p>	<p>Create questions involving + - x fractions  Looking at fractions greater than 1  Use of fractions in an everyday context</p>	<p>How many hours in a week (minute? Seconds?) How many until end of term? End of year  Using in everyday context to solve</p>

						problems where units differ
Links to Modern Britain	Tolerance and mutual respect: Student code of conduct. Good working relationships in the classroom and around the college that promote effective learning.	Understanding of the decimal system	Individual Liberty: Taking risks in problem solving	Rule of Law: Apply rules with calculations	Understand that UK is predominantly imperial, and Europe is metric, but we use metric in our measurements.	Understanding of the origin of time (Babylonian/Egyptian system combined with astronomy), and why we have 60 seconds/minutes but 24 hours
Gatsby links	1 3	1 4	3 5	1 2	2 6	4 6
Hinterland Knowledge	Multi link cubes, numicon tiles, dienes rods, Lego bricks.  Depending on the specific part of number, Number lines to support rounding to nearest whole number/decimal Number underpins the fabric of maths, and is an essential part of being able to count/use money. Almost all employment will require the use of decimals, whether it is builders measuring, athletes attempting to improve times, or nurses prescribing the correct medication				Knowing the start of the school day, lesson timings, break/lunch etc and how the school day first into a 24 hour day. Common unit fractions will lead into time (fractions of an hour)	

Year 6	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	<b>Number</b>	<b>Number &amp; Place Value Geometry</b>	<b>Number Measurement Geometry</b>	<b>Fractions &amp; Percentages</b>	<b>Statistics</b>	<b>Ratio &amp; Proportion Number Order of Operations Mean Average</b>
Knowledge	Knowledge of structures (1)  Multiples of 1,000	Place Value  Draw, compose and decompose shapes	Multiplication and Division  Area & Perimeter  Position and Direction	Adding & Subtracting fractions  Multiplying & Dividing fractions by a whole number  Linking Fractions, Decimals, and percentages	Pie Charts  Line Graphs	Scale factor, Ratio & Proportional Reasoning  Knowledge of structures (2)  Solving Problems with 2 unknowns  Order of Operations  Mean average
Skills	<b>Knowledge of structures</b> <ul style="list-style-type: none"> <li>explain how a combination of different parts can be equivalent to the same whole and can</li> </ul>	<b>Place Value</b> <ul style="list-style-type: none"> <li>use representations to identify and explain patterns in powers of 10</li> <li>compose seven or eight-digit numbers</li> </ul>	<b>Multiplication and Division</b> <ul style="list-style-type: none"> <li>explain why the product stays the same when one factor</li> </ul>	<b>Fractions</b> <ul style="list-style-type: none"> <li>explain how to write a fraction in its simplest form</li> <li>reason and apply their knowledge of how to</li> </ul>	<b>Pie Charts</b> <ul style="list-style-type: none"> <li>Interpret and construct Pie Charts</li> </ul> <b>Line Graphs</b> <ul style="list-style-type: none"> <li>Interpret and construct Line Graphs</li> </ul>	<b>Ratio</b> <ul style="list-style-type: none"> <li>describe the relationship between two factors (in a ratio context)</li> </ul>

	<p>represent this in an expression</p> <ul style="list-style-type: none"> <li>• identify structures within stories and use their knowledge of structures to create stories</li> <li>• identify the missing part using their knowledge of part-whole relationships and structures</li> <li>• interpret and represent a part-whole problem with 3 addends using a model</li> <li>• create stories to correctly match a structure presented in a model</li> <li>• use their knowledge of additive structures to solve problems</li> <li>• calculate the value of a missing part (1)</li> <li>• calculate the value of a missing part (2)</li> <li>• correctly represent an equation in a part-whole model</li> <li>• explain how adjusting both addends affects the sum (2 digit numbers)</li> <li>• explain how adjusting both addends affects the sum (decimal fractions)</li> <li>• use the 'same sum' rule to balance equations</li> <li>• use the 'same sum' rule to balance</li> </ul>	<p>using common intervals</p> <ul style="list-style-type: none"> <li>• use their knowledge of the composition of up to eight-digit numbers to solve problems</li> <li>• explain how to read numbers with up to seven digits</li> <li>• efficiently recognise and create numbers that contain place-holding zeros</li> <li>• determine the value of digits in numbers up to tens of millions</li> <li>• explain how to compare up to eight-digit numbers</li> <li>• use their knowledge of the composition of seven-digit numbers to solve problems</li> <li>• add and subtract mentally without bridging a boundary (only one and more than one digit changes)</li> <li>• add numbers whilst crossing the millions boundary</li> <li>• subtract numbers whilst crossing the millions boundary (multiples of 100,000 and different powers of 10)</li> <li>• explain how a seven-digit number can be composed and decomposed into parts</li> </ul>	<p>is doubled and the other is halved</p> <ul style="list-style-type: none"> <li>• explain the effect on the product when scaling the factors by the same amount</li> <li>• use their knowledge of equivalence when scaling factors to solve problems</li> <li>• explain the effect on the quotient when scaling the dividend and divisor by 10</li> <li>• explain the effect on the quotient when scaling the dividend and divisor by the same amount</li> <li>• explain how to multiply a three-digit by a two-digit number</li> <li>• explain how to accurately use the method of long multiplication to multiply two, two-digit numbers (no regrouping of ones to tens)</li> <li>• explain how to accurately use the method of long multiplication (with regrouping of ones to tens)</li> <li>• explain how to accurately use the method of long multiplication (with regrouping of ones to</li> </ul>	<p>write a fraction in its simplest form</p> <ul style="list-style-type: none"> <li>• use their knowledge of how to write a fraction in its simplest form when solving addition and subtraction problems 1</li> <li>• use their knowledge of how to write a fraction in its simplest form when solving addition and subtraction problems 2</li> <li>• use their knowledge of how to write a fraction in its simplest form when solving multiplication problems</li> <li>• explain, using an image, how to add related fractions (unit fractions)</li> <li>• explain what is meant by 'related fractions'</li> <li>• explain, without using an image, how to add related fractions</li> <li>• use their knowledge of adding related fractions to solve problems in a range of contexts</li> <li>• explain, with and without using an image, how to subtract related fractions (unit fractions)</li> </ul>		<ul style="list-style-type: none"> <li>• explain how to use multiplication and division to calculate unknown values (two variables)</li> <li>• explain how to use multiplication and division to calculate unknown values (three variables)</li> <li>• explain how to use a ratio grid to calculate unknown values</li> <li>• explain how to use multiplication to solve correspondence problems</li> <li>• explain how and why scaling is used to make and interpret maps will use their knowledge of multiplication and division to solve scaling problems in a range of contexts</li> <li>• identify and describe the relationship between two shapes using scale factors (squares)</li> <li>• identify and describe the relationship between two shapes using scale factors and ratios (regular polygons)</li> <li>• identify and describe the relationship between two shapes using scale factors and</li> </ul>
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	<p>equations with an unknown</p> <ul style="list-style-type: none"> <li>• explain how adjusting one addend affects the sum</li> <li>• solve addition calculations mentally by using known facts</li> <li>• solve calculations with missing addends</li> <li>• explain how adjusting both the minuend and subtrahend by the same amount affects the difference</li> <li>• explain how using the 'same difference' rule can make mental calculation easier (1)</li> <li>• explain how using the 'same difference' rule can make written calculation easier (2)</li> <li>• use the 'same difference' rule to balance equations</li> <li>• explain how increasing or decreasing the minuend affects the difference (1)</li> <li>• explain how increasing or decreasing the minuend affects the difference (2)</li> <li>• solve subtraction calculations mentally by using known facts</li> <li>• explain how adjusting the minuend can make mental calculation easier</li> </ul>	<ul style="list-style-type: none"> <li>• identify and explain a pattern in a counting sequence</li> <li>• identify numbers with up to seven digits on marked number lines</li> <li>• estimate the value and position of numbers on unmarked or partially marked number lines</li> <li>• explain why we round and how to round seven-digit numbers to the nearest million</li> <li>• explain how to round seven-digit numbers to the nearest hundred thousand</li> <li>• explain how to round up to seven-digit numbers to any power of 10 in context</li> <li>• identify and explain the most efficient way to solve a calculation</li> <li>• add and subtract numbers with up to seven digits</li> <li>• using column addition and subtraction</li> <li>• explore and explain different written and mental strategies to solving addition and subtraction problems</li> <li>• solve addition and subtraction problems and explain whether a mental or written strategy would be most efficient</li> </ul> <p><b>Draw, compose and decompose shapes</b></p>	<p>tens &amp; tens to hundreds)</p> <ul style="list-style-type: none"> <li>• explain how to accurately use the method of long multiplication to multiply a three-digit by a two-digit number</li> <li>• explain how to accurately use the method of long multiplication to multiply a four-digit by a two-digit number</li> <li>• explain how to use the associative law to multiply efficiently</li> <li>• explain when it is more efficient to use long multiplication or factorising to multiply by two-digit numbers</li> <li>• explain how to use accurately the methods of short and long division (two and three-digit number by multiples of 10)</li> <li>• explain how to use accurately the method of long division with and without remainders (two-digit by two-digit numbers)</li> <li>• use knowledge of long division to solve problems in a range of contexts (with and without remainders)</li> <li>• explain how to use a ratio chart to solve</li> </ul>	<ul style="list-style-type: none"> <li>• use their knowledge of adding and subtracting related fractions to solve problems in a range of contexts</li> <li>• explain, with and without using an image, how to add and subtract related fractions (non-unit fractions)</li> <li>• explain, with and without using an image, how to add and subtract related fractions (non-unit fractions that bridge the whole)</li> <li>• use their fraction sense to fraction addition, subtraction and comparison explain how to add or subtract non-related fractions with different denominators</li> <li>• use their knowledge of adding or subtracting non-related fractions with different denominators to solve problems in a range of contexts (non related fractions)</li> <li>• explain how to compare pairs of non-related fractions (converting to</li> </ul>		<p>ratios (irregular polygons)</p> <p><b>Knowledge of structures (2)</b></p> <ul style="list-style-type: none"> <li>• explain how to balance equations with addition expressions</li> <li>• explain how to balance equations with subtraction expressions</li> <li>• explain how to balance equations with addition or subtraction expressions</li> <li>• explain how to balance equations with addition and subtraction expressions</li> <li>• use their knowledge of balancing equations to solve problems</li> </ul> <p><b>Solving problems with 2 unknowns</b></p> <ul style="list-style-type: none"> <li>• compare the structure of problems with one or two unknowns</li> <li>• compare the structure of problems with two unknowns</li> <li>• represent the structure of contextual problems with two unknowns</li> <li>• represent a problem with two unknowns using a bar model</li> </ul>
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	<ul style="list-style-type: none"> <li>explain how adjusting the subtrahend affects the difference</li> <li>explain how increasing or decreasing the subtrahend affects the difference</li> <li>calculate the difference using their knowledge of an adjusted subtrahend (1)</li> <li>calculate the difference using their knowledge of an adjusted subtrahend (2)</li> </ul> <p><b>Multiples of 1,000</b></p> <ul style="list-style-type: none"> <li>explain how ten thousand can be composed</li> <li>explain how one hundred thousand can be composed</li> <li>read and write numbers up to one million (1)</li> <li>read and write numbers up to one million (2)</li> <li>identify and place the position of five-digit multiple of one thousand numbers, on a marked, but unlabelled number line</li> <li>identify and place the position of six-digit multiple of one thousand numbers, on a marked, but</li> </ul>	<ul style="list-style-type: none"> <li>Use knowledge of shape properties to draw, sketch and identify shapes.</li> <li>The same 3D shape can be composed from different 2D nets.</li> <li>When a 2D shape is decomposed and the parts rearranged, the area remains the same.</li> <li>The area of a compound shape is therefore equal to the total of the areas of the constituent parts.</li> <li>Any parallelogram can be decomposed and the parts rearranged to form a rectangular parallelogram.</li> <li>Two congruent triangles can be composed to form a parallelogram.</li> <li>Shapes with the same area can have different perimeters. Shapes with the same perimeters can have different areas.</li> <li>We can use the relationship between area and side length, and perimeter and side length, to reason about measurements of shapes, including compound shapes.</li> </ul>	<p>efficiently: short division</p> <ul style="list-style-type: none"> <li>explain how to use a ratio chart to solve efficiently: long division</li> <li>explain how to use a ratio chart to solve efficiently: long division (II)</li> <li>explain how to use accurately the method of long division with and without remainders (three-digit by two-digit, four-digit by two-digit numbers)</li> <li>use long division with decimal remainders (1 decimal place)</li> <li>use long division with fraction remainders</li> <li>use long division with decimal remainders (2 decimal places)</li> <li>use knowledge of the best way to interpret and represent remainders from a range of division contexts</li> <li>explain how and why a product changes when a factor changes multiplicatively</li> <li>use their knowledge of multiplicative change to solve problems efficiently (multiplication)</li> </ul>	<p>common denominators)</p> <ul style="list-style-type: none"> <li>explain how to compare pairs of non-related fractions (using fraction sense)</li> <li>explain how to compare pairs of non-related fractions (using common numerators)</li> <li>explain which method for comparing non-related fractions is most efficient</li> <li>explain how to multiply two unit fractions</li> <li>explain how to multiply two non-unit fractions</li> <li>explain how to divide a unit fraction by a whole number</li> <li>explain how to divide a non-unit fraction by a whole number</li> <li>explain when and how to divide efficiently a fraction by a whole number</li> </ul> <p><b>Percentages</b></p> <ul style="list-style-type: none"> <li>explain what percent means explain how to represent a percentage in different ways</li> <li>explain how to convert percentages to decimals and fractions (with a denominator of 100)</li> </ul>		<ul style="list-style-type: none"> <li>explain why sometimes there is only one solution to a sum and difference problem</li> <li>explain why sometimes there is only one solution to a sum and multiple problem</li> <li>explain the values a part-whole model could represent</li> <li>use a bar model to visualise how to solve a problem with two unknowns</li> <li>use diagrams to explain how to solve a spatial problem</li> <li>explain how to represent an equation with a bar model</li> <li>solve problems with two unknowns in a range of contexts</li> <li>systematically solve problems with two unknowns using 'trial and improvement' (one and several solutions)</li> <li>explain how I know I have found all possible solutions to problems with two unknowns</li> <li>explain how to balance an equation with two unknowns</li> <li>systematically solve problems with two</li> </ul>
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	<p>unlabelled number line</p> <ul style="list-style-type: none"> <li>count forwards and backwards in steps of powers of 10, from any multiple of 1,000</li> <li>explain that 10,000 is composed of 5,000s 2,500s and 2,000s</li> <li>explain that 100,000 is composed of 50,000s 25,000s and 20,000s</li> <li>read scales in graphing and measures contexts, by using their knowledge of the composition of 10,000 and 100,000</li> </ul>		<ul style="list-style-type: none"> <li>explain how and why a quotient changes when a dividend changes multiplicatively (increase or decrease)</li> <li>explain how and why a quotient changes when a divisor changes multiplicatively</li> <li>identify and explain the relationship between divisors and quotients</li> </ul> <p><b>Area, Perimeter &amp; Volume</b></p> <ul style="list-style-type: none"> <li>explain how to calculate the area of a parallelogram</li> <li>explain how to calculate the area of a triangle</li> <li>explain why shapes can have the same perimeters but different areas</li> <li>explain why shapes can have the same areas but different perimeters</li> <li>describe the relationship between scale factors and side lengths of two shapes</li> <li>describe the relationship between scale factors and perimeters of two shapes</li> </ul> <p><b>Position &amp; Direction</b></p>	<ul style="list-style-type: none"> <li>explain how to convert a percentage to a fraction (without denominator of 100)</li> <li>use their knowledge of fraction-decimal-percentage conversions to solve conversion problems in a range of contexts</li> <li>use their knowledge of calculating 50%, 10% and 1% of a number to solve problems in a range of contexts</li> <li>use their knowledge of calculating common percentages of a number to solve problems in a range of contexts</li> <li>use their knowledge of calculating any percentage of a number to solve problems in a range of contexts</li> <li>explain how to solve problems where the percentage part and the size of the part is known and the whole is unknown</li> <li>explain how to solve problems where the known percentage part and the size of the part changes the whole</li> </ul>		<p>unknowns using 'trial and improvement' (one, several and infinite solutions)</p> <p><b>Order of Operations</b></p> <ul style="list-style-type: none"> <li>explain how addition and subtraction can help to solve multiplication problems efficiently (I)</li> <li>explain how addition and subtraction can help to solve multiplication problems efficiently (II)</li> <li>explain how the distributive law applies to multiplication expressions with a common factor (addition)</li> <li>use their knowledge of the distributive law to solve equations including multiplication, addition and subtraction</li> <li>explain how addition and subtraction can help to solve division problems efficiently</li> <li>explain how the distributive law applies to division expressions with a common divisor (addition)</li> <li>explain how the distributive law</li> </ul>
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			<ul style="list-style-type: none"> <li>describe positions on the full coordinate grid (all four quadrants)</li> <li>draw and translate simple shapes on the coordinate plane and reflect them in the axes</li> </ul>			<p>applies to division expressions with a common divisor (subtraction)</p> <ul style="list-style-type: none"> <li>use their knowledge of the distributive law to solve equations including division, addition and subtraction</li> </ul> <p><b>Mean Average</b></p> <ul style="list-style-type: none"> <li>explain the relationship between the mean and sharing equally</li> <li>explain how to calculate the mean of a set of data</li> <li>explain how the mean changes when the total quantity or number of values changes</li> <li>explain how to calculate the mean when one of the values in the data set is zero or missing</li> <li>explain how to use the mean to make comparisons between two sets of information</li> <li>explain when the mean is not an appropriate representations of a set of data</li> </ul>
Key Vocabulary/reading opportunities	Arithmetic: the art of computation	Decompose: to separate into parts	Perimeter: Peri – around; meter - measure	Percent: Per – part; cent - hundred	Statistics: numerical data of any sort collected and classified systematically	Ratio: relation between two similar magnitudes in respect to quantity

Stretch and Challenge	Development of APE skills (Analyse, Prove, Explain)	Knowledge of place value to 3 decimal places	Ability to answer open ended questions – eg: can you draw a shape in which the area is numerically twice the perimeter	Open ended questions – making the question incrementally more complex (eg, working backwards)	Use percentage (from degrees) of Pie Chart to solve problems	Choosing problems that have more than one solution, or problems that cannot be solved quickly.
Links to Modern Britain	Tolerance and mutual respect: Student code of conduct: Good working relationships in the classroom and around the college that promote effective learning.	Rule of Law: Ensure calculations are carried out correctly	Rule of Law: Apply rules with calculations	Individual Liberty: being allowed to make mistakes and learn from them	Democracy: Use of statistics to justify and argue for particular positions	Rule of Law: Apply rules with calculations
Gatsby links	1 4	2 3	1 3	1 5	2 4	2 6
Hinterland Knowledge	Place Value charts and counters, Gattegno charts, number lines, part-whole models, bar models Recognise that multiplication is repeated addition, but squaring/cubing is not			Ability to connect between fractions and percentages in preparation for KS3	This is an introduction to part of the statistics in preparation for KS3. Students should connect knowledge of fractions with the charts/graphs.	

Year 7	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	<b>Place Value &amp; Properties of Number</b>	<b>Operating on Number &amp; Number</b>	<b>Geometry</b>	<b>Number &amp; Operating on Number</b>	<b>Multiplicative Reasoning</b>	<b>Geometry</b>
Knowledge (need to know)	Place Value, estimation and rounding.  Property of number: factors, multiples, squares, cubes & primes	Arithmetic procedures with integers & decimals  Expressions & Equations	Plotting coordinates  Perimeter & Area	Ordering & comparing  Arithmetic procedures including fractions.	Understanding multiplicative relationships: fractions and ratio	Transformations
Skills (Application)	<b>Place Value</b> <ul style="list-style-type: none"> <li>Understand the value of digits in decimals, measures and integers.</li> </ul> <b>Property of Number</b> <ul style="list-style-type: none"> <li>Understand multiples, integer exponents, roots and use the unique prime factorisation of a number.</li> <li>Calculate HCF and LCM of pairs of numbers</li> </ul>	<b>Operating on Number</b> <ul style="list-style-type: none"> <li>Add, subtract, multiply &amp; divide integers &amp; decimals.</li> <li>Use the laws of arithmetic to calculate efficiently.</li> </ul> <b>Number</b> <ul style="list-style-type: none"> <li>Form and interpret expressions and equations.</li> <li>Simplify algebraic expression.</li> </ul>	<b>Plotting Coordinates</b> <ul style="list-style-type: none"> <li>Connect coordinates, equations and graphs.</li> </ul> <b>Perimeter &amp; Area</b> <ul style="list-style-type: none"> <li>Understand the concept of perimeter and area.</li> </ul>	<b>Number</b> <ul style="list-style-type: none"> <li>Work with terminating decimals and their corresponding fractions.</li> <li>Compare and order positive and negative integers, decimals and fractions.</li> </ul> <b>Arithmetic procedures including fractions</b>	<b>Multiplicative Reasoning with fractions &amp; ratio</b> <ul style="list-style-type: none"> <li>Understand the concept of multiplicative relationships</li> <li>Understand that fractions as a multiplicative relationship.</li> <li>Understand ratios as multiplicative relationship.</li> </ul>	<b>Transformations</b> <ul style="list-style-type: none"> <li>Understand and use translations.</li> <li>Understand and use rotations.</li> <li>Understand and use reflections.</li> <li>Understand and use enlargements.</li> </ul>

		<ul style="list-style-type: none"> <li>Manipulate algebraic expressions.</li> </ul>		<ul style="list-style-type: none"> <li>Add &amp; subtract fractions.</li> <li>Multiply &amp; divide fractions</li> </ul>		
Key Vocabulary/reading opportunities	Factor: <i>a number is a number that divides the given number evenly or exactly, leaving no remainder</i>	Expression: any mathematical statement which consists of numbers, variables and an arithmetic operation between them (eg $4n+5$ ) Equation: a mathematical statement that shows two expressions are equal ( $4n+5 = 17$ )	Co-ordinates: each of two or more magnitudes used to define the position of a point, line or plane	Terminating: to mark the end or boundary	Reasoning: act or process of thinking logically	Transformation: change in shape, metamorphose
Stretch and Challenge	<p style="text-align: center;">Opportunities for S &amp; C are embedded throughout the Year for KS3</p> <p style="text-align: center;">In addition to the suggestions below, ideas are also taken from the NCETM Checkpoints and further activities, along with ideas from NRICH and MEI (Maths in education and industry)</p>					
	Finding numbers between fraction (eg between $\frac{1}{4}$ and $\frac{1}{5}$ ) Finding numbers between decimals (eg between 0.1 and 0.2)	Matching expression with words What is the same, what is different. Always, Sometimes, Never	Given a pair of vertices for 2 points of a square, identify what the other co-ordinates could be. Working with non-integer co-ordinates	Simplifying fractions: explain how you know the fraction is simplified.	Opportunities to find the mistakes. Creating questions for other students	Carrying out enlargements by a fractional or negative enlargement
Links to Modern Britain	Tolerance and mutual respect: Student code of conduct. Good working relationships in the classroom and around the college that promote effective learning.	Rule of Law: Apply rules with calculations	Democracy: consider the rule of law by looking at legal constraints which are numerical in nature (such as speed limits)	Rule of Law: Apply rules with calculations	Individual Liberty: being allowed to make mistakes and learn from them	Individual Liberty: Devising ways to present ideas and solution
Gatsby links	1 6	2 5	3 4	2 3	2 3	3
Hinterland Knowledge	Use of number lines, multiplication grids to support student progress, especially with negative numbers	Multiplying decimals require a 'scale up' to integer values prior to converting back to original. Both sides of an equal sign must balance for an equation to hold true	Plotting co-ordinates connects reading (left to right) and the alphabet (x is before y). This knowledge is often confused, and students will transpose the x and y co-ordinates, in addition to misrepresenting negative co-ordinates	Use of multilink cubes to help with ordering fractions – giving a visual representation of fractions and their equivalences	Students understand that any two numbers will have a multiplicative relationship. That compound measures such as speed, density, pressure, etc are ways of describing a relationship between one measure and another.	Students are able to describe what is the same and what is difference when it comes to transformation of shapes

Year 8	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	<b>Number</b> <b>Sequences &amp; Graphs</b>	<b>Sequences &amp; Graphs</b> <b>Operating on Number</b>	<b>Multiplicative Reasoning</b>	<b>Statistics &amp; Probability</b>	<b>Geometry</b>	<b>Geometry</b>
Knowledge	Estimation and rounding  Sequences  Graphical representations	Graphical representations  Solving linear equations	Understanding multiplicative relationships	Statistical representations, measures and analysis	Perimeter, area and volume  Geometrical properties: polygons	Geometrical properties: polygons  Constructions
Skills	<b>Estimation and rounding</b> <ul style="list-style-type: none"> <li>Round numbers to nearest decimal places and significant figures.</li> <li>Estimate calculations.</li> </ul> <b>Sequences</b> <ul style="list-style-type: none"> <li>Understand the features of a sequence.</li> <li>Recognise and describe arithmetic sequences.</li> </ul> <b>Graphical representations</b> <ul style="list-style-type: none"> <li>Connect coordinates, equations and graphs.</li> </ul>	<b>Graphical representations</b> <ul style="list-style-type: none"> <li>Explore linear relationships.</li> </ul> <ul style="list-style-type: none"> <li><b>Solving linear equations</b></li> <li>Find solutions to linear equations with one unknown.</li> <li>Solve a linear equation with a single unknown on one side where obtaining the solution requires one or multiple steps</li> <li>Solve efficiently linear equations with a single unknown involving brackets.</li> </ul>	<b>Understanding multiplicative relationships</b> <ul style="list-style-type: none"> <li>Understand that multiplicative relationships can be represented in a number of ways.</li> <li>Understand that percentages as a multiplicative relationship.</li> <li>Understand proportionality.</li> </ul>	<b>Statistical representations, measures and analysis</b> <ul style="list-style-type: none"> <li>Understand and calculate accurately measures of central tendency and spread.</li> <li>Construct accurately statistical representations.</li> <li>Interpret reasonably statistical measures and representations.</li> <li>Choose appropriately statistical measures and representations.</li> </ul>	<b>Perimeter, area and volume</b> <ul style="list-style-type: none"> <li>Understand the concept of perimeter, area and volume and use them in a range of problem-solving situations.</li> </ul> <b>Geometrical properties: polygons</b> <ul style="list-style-type: none"> <li>Understand and use angle properties.</li> </ul>	<b>Geometrical properties: polygons</b> <ul style="list-style-type: none"> <li>Understand and use angle properties.</li> </ul> <ul style="list-style-type: none"> <li><b>Constructions</b></li> <li>Use the properties of a circle in constructions.</li> <li>Use the properties of a rhombus in constructions.</li> </ul>
Key Vocabulary/reading opportunities	Sequence: a series of thing following in a certain order Arithmetic sequence: A sequence of numbers in which successive terms are generated by adding or subtracting a constant amount to/from the preceding term.	Graph: a diagram that is used to represent accrued data	Proportionality: comparative relation or analogy	Statistics: numerical data of any sort collected and classified systematically Probability: likelihood of being realised; appearance of truth; quality of being probable	Area: the size of a surface Volume: the amount of space a 3D shape takes up	Geometry: a branch of mathematics that <i>studies the sizes, shapes, positions, angles, and dimensions of things</i>
Stretch and Challenge	Opportunities for S & C are embedded throughout the Year for KS3 In addition to the suggestions below, ideas are also taken from the NCETM Checkpoints and further activities, along with ideas from NRICH and MEI (Maths in education and industry)					
Stretch and Challenge	Making connections between sequences and graphs, sequences and real life.		Recognise that depth of understanding of MR is not limited to integers, or	Connect between theoretical and relative	Opportunities to combine A, P & V and constructions to inform designs of buildings, gardens, open spaces, from	

	If I needed to find the 100th term in a sequence, is there a quicker way than just continuing the sequence until I reach it.		positive numbers. Opportunities to stretch into decimal, negative numbers etc	probabilities, to justify either/both probabilities	the simple shapes, to compound shapes, and into 3D shapes	
Links to Modern Britain	Tolerance and mutual respect: Student code of conduct. Good working relationships in the classroom and around the college that promote effective learning.	Use of morse code (specifically with numbers) to show how sequences enable communication via non verbal means	Rule of Law: Taxation and the economy.	Democracy: Use of statistics to justify and argue for particular positions Historical weather events are often referred to when we encounter significant drought, hot temperatures, etc	Geometry is used in all of the sciences, and also within art and architecture. Architects and artists use geometry for planning, whether this is buildings, or statues/sculptures	
Gatsby links	1 3	1 3	2 4	2 5	2 3	1 6
Hinterland Knowledge	Multi link cubes to make links between CPA. Using sequences to connect to real life – such as a plumber will price a job based on a call out fee, and an hourly rate per job. This can be compared to another trade job, that would not have a call out charge, but may have a higher hourly rate – which job would pay the most?		Problem solving and reasoning is a key part of preparation for, and progressing from GCSE to A Level maths (ready for Kings)	Statistics are used by sports coaches, to identify trends to help athletes improve. Probability is used by weather forecasters, to help understand both weather patterns and the climate	Connecting volume of a shape gives students an understanding of the physical quantity that can be held, whether it is a solid, liquid or a gas	

**Gatsby Links Key:**

<p><b>1. Develop spatial reasoning skills:</b> Maths education helps children to develop their spatial reasoning skills, which are essential for many jobs, such as engineering, architecture, and urban planning. Spatial reasoning skills are also important for everyday tasks, such as driving, navigating public transportation, and understanding maps.</p>	<p><b>2. Improve problem-solving skills:</b> Maths education teaches children to think critically and reason and problem solve. They learn to analyse data, identify patterns, and make informed decisions. These skills are transferable to many different types of jobs, including the sciences, business, law, and healthcare.</p>	<p><b>3. Enhance communication skills:</b> Maths education helps children to develop their communication skills, both written and verbal. They learn to present information clearly and concisely, both written pictorial, and to support their arguments with evidence. These skills are essential for success in any field of employment.</p>
<p><b>4. Cultural awareness and empathy:</b> Maths education helps children to develop an understanding of different cultures and societies. Maths transcends cultural boundaries and its importance is universally recognised. They learn about the world's populations, currency and economies. They also learn about how maths is taught in different countries. This understanding is essential for working in a globalized economy.</p>	<p><b>5. Prepares students for education and careers:</b> Maths education can also prepare students for employment. Maths is a gatekeeper for most jobs, and A Level maths is now the most popular A Level in England</p>	<p><b>6. Develop a sense of global citizenship:</b> Students learn how to become curious and want to use maths to explore patterns and formulate ideas about the world. Maths education is an essential part of preparing children for the future.</p>

