Mathematics Long Term Plan – Upper Key Stage 2

Year 5			
Year 5	**Autumn**	**Spring**	**Summer**
NUMBER			
Number and place value	• Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit *e.g. order a set of multi-digit numbers from smallest to largest - 37 700, 737 570, 737 507, 37 570* • Count forwards or backwards in steps of powers of 10 from any given number up to 1 000 000 *e.g. 197 000, 198 000, 199 000, 200 000, 201 000…* • Round any number up to 1 000 000 to the nearest 10, 100 and 1000 e.g. *265 946 to the nearest 1000 (266 000)* • Solve number problems and practical problems that involve number, place value and rounding e.g. *What number is halfway between 560 500 and 560 600?*	• Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit e.g. what is the smallest integer you can make using all of these digits: 8, 1, 0, 5, 6? • Count forwards or backwards in steps of powers of 10 from any given number up to 1 000 000 • Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero *e.g. count back in threes: 8, 5, 2, -1, -4, -7…* • Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 • Solve number problems and practical problems that involve number, place value and rounding e.g. *What is the largest 4-digit number whose digits sum to 20? (9920).* • *Recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule e.g. find the rule and complete the sequence: ___, 16, 8, 4, ___, 1, 0.5, ___ (rule is: halve previous number)*	• Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit *e.g. What must be added to 37 500 to change it to 67 500?* • Count forwards or backwards in steps of powers of 10 from any given number up to 1 000 000 • Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero • Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 • Solve number problems and practical problems that involve number, place value and rounding. *e.g. The distance to the bus stop is 1km to the nearest 100m; what is the shortest distance it could be?* • *Recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule e.g. find the rule and complete the sequence: ___, 16, 8, 4, ___, 1, 0.5, ___* • Read Roman numerals to 1000 (M) and recognise years written in Roman numerals. e.*g. MCMXIV (1914)*

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Addition and subtraction	• Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • Add and subtract numbers mentally with increasingly large numbers *e.g. 15 400 – 2000 = 13 400* • Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why *e.g. I have read 124 of the 526 pages of my book; how many more pages must I read to reach the middle?*	• Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • Add and subtract numbers mentally with increasingly large numbers • Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why *e.g. I bought some stickers on Monday; on Tuesday I bought 20 more than I bought on Monday; now I have 70; how many stickers did I buy on Monday?*	• Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • Add and subtract numbers mentally with increasingly large numbers *e.g. 12 462 – 2 300 = 10 162* • Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why *e.g. Write a number story for this number sentence: 3709=4562+234-1087*

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| **Multiplication and division** | • *Continue to practise and apply multiplication tables and related division facts, committing them to memory and using them confidently to make larger calculations*
• Identify multiples and factors, including finding all factor pairs of a number and common factors of two numbers
• Know and use the vocabulary of prime numbers and composite (non-prime) numbers
• Establish whether a number up to 100 is prime and recall prime numbers up to 19
• Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
• Multiply and divide numbers mentally drawing upon known facts *e.g. 60×9*
• Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 *e.g. 456÷100=4.56*
• Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
e.g. 40×8=500 - ☐ | • *Continue to practise and apply multiplication tables and related division facts, committing them to memory and using them confidently to make larger calculations*
• Identify multiples and factors, including finding all factor pairs of a number and common factors of two numbers
• Know and use the vocabulary of prime numbers and composite (non-prime) numbers
• Establish whether a number up to 100 is prime and recall prime numbers up to 19
• Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
• Multiply and divide numbers mentally drawing upon known facts *e.g. 630÷9*
• Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
• Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context *e.g. 98 ÷ 4 = 24 r 2 = 24½ = 24.5 ≈ 25.*
• Recognise and use square numbers and cube numbers, and the notation | • *Continue to practise and apply multiplication tables and related division facts, committing them to memory and using them confidently to make larger calculations*
• Identify multiples and factors, including finding all factor pairs of a number and common factors of two numbers
• Solve problems involving multiplication and division where larger numbers are used by decomposing them into their factors *e.g. 828÷36 = (828÷4)÷9 = 207÷9 = 23*
• Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers *e.g. prime factors of 60=2×2×3×5*
• Establish whether a number up to 100 is prime and recall prime numbers up to 19
• Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
• Multiply and divide numbers mentally drawing upon known facts *e.g. 840÷12*
• Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 |

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		for squared (^{2}) and cubed (^{3}) • Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign *e.g. There are 6 shelves of books; 3 shelves hold 35 books each, one shelf holds 45 books and the top two shelves have the same number of books on each; there are 200 books altogether; how many books are on the very top shelf?*	• Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context • Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}) • Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign • Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.*eg a toymaker can make 8 toys in 2 hours; how many toys can he make in 5 hours?*

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| Fractions (including decimals and percentages) | • *Know that percentages, decimals and fractions are different ways of expressing proportions*
• *Count forwards and backwards in fractions and decimals bridging zero*
• Compare and order fractions whose denominators are all multiples of the same number *e.g. put these fractions in order from the smallest: $^5/_{12}, ^5/_6, ^{11}/_{12}, ^2/_3$*
• Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths *making links to decimals and measures e.g. $^{37}/_{100}$ metre = 0.37m*
• Read and write decimal numbers as fractions *e.g. 0.71 = 71/100*
• *Mentally add and subtract:*
   ○ *tenths e.g. 0.8 - 0.3*
   ○ *one-digit whole numbers and tenths e.g. 3.4 + 2.6*
   ○ *complements of 1 e.g. 0.85 + 0.15 = 1*
• Recognise the per cent symbol (%) and understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator hundred, and as a decimal fraction *e.g. 43% = $^{43}/_{100}$ = 0.43* | • *Know that percentages, decimals and fractions are different ways of expressing proportions*
• *Count forwards and backwards in fractions and decimals bridging zero*
• Compare and order fractions whose denominators are all multiples of the same number
• Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths *making links to decimals and measures*
• *Connect fractions >1 to division with remainders e.g. $^5/_4$ = 5÷4=$1^1/_4$*
• Recognise mixed numbers and improper fractions and convert from one form to the other *e.g. $5^2/_3 = ^{17}/_3$* and write mathematical statements >1 as a mixed number *e.g. $^2/_5 + ^4/_5 = ^6/_5 = 1^1/_5$*
• Add and subtract fractions with the same denominator and multiples of the same number *e.g. $^2/_3 + ^1/_6 = ^5/_6$*
• *Find fractions of numbers and quantities e.g. $^3/_4$ of £14*
• *Connect multiplication by a fraction to using fractions as operators e.g. $^2/_3$ of 12 = 12 × $^2/_3$*
• Read and write decimal numbers as fractions | • *Know that percentages, decimals and fractions are different ways of expressing proportions*
• *Count forwards and backwards in fractions and decimals bridging zero*
• Compare and order fractions whose denominators are all multiples of the same number
• Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths *and extending to thousandths, making links to decimals and measures e.g. $^{755}/_{1000}$ kg = 0.755kg*
• *Connect fractions >1 to division with remainders e.g. $^{37}/_5$ = 37÷5=$7^2/_5$*
• Recognise mixed numbers and improper fractions and convert from one form to the other *e.g. $5^2/_3 = ^{17}/_3$* and write mathematical statements >1 as a mixed number
• Add and subtract fractions with the same denominator and multiples of the same number *e.g. $^2/_5 + ^7/_{10} = ^{11}/_{10} = 1^1/_{10}$*
• *Find fractions of numbers and quantities e.g. $^7/_8$ of 240ml*
• *Connect multiplication by a fraction to using fractions as operators e.g. $^8/_5$ of 40 = 40 × $^8/_5$* |

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	• *Recognise that percentages are proportions of quantities e.g. 40% of the class are boys; what percentage are girls? as well as operators on quantities e.g. find 40% of 30 children.*	• *Mentally add and subtract:*
		  ○ *tenths e.g. 0.8 + 0.9*
		  ○ *one-digit whole numbers and tenths e.g. 3.1 – 2.9*
		  ○ *complements of 1 e.g. 0.83 + 0.17 = 1*
		
		• *Add and subtract decimals with a different number of decimal places e.g. 102.3 + 97.82*
		• Round decimals with two decimal places to the nearest whole number and to one decimal place *e.g. 27.59=27.6 (1d.p.)*
		• Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents *e.g. $^{650}/_{1000}$ = $^{65}/_{100}$ = 0.65;*
		• Read, write, order and compare numbers with up to three decimal places *e.g. put these decimals in order starting from the smallest: 0.457, 0.42, 0.46, 0.426*
		• Solve problems *and puzzles* involving number up to three decimal places, *checking the reasonableness of answers*
		• Recognise the per cent symbol (%) and understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator hundred, and as a
			• Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. *e.g. use egg boxes to represent $2^5/_6 \times 3 = 6^{15}/_6 = 8^3/_6 = 8^1/_2$*
			• Read and write decimal numbers as fractions *e.g. $0.8 = ^4/_5$*
			• *Mentally add and subtract:*
			  ○ *tenths e.g. 0.8 + 0.9 – 0.2*
			  ○ *one-digit whole numbers and tenths e.g. 7.4 – 6.6*
			  ○ *complements of 1 e.g. 0.83 + 0.17 = 1*
			• *Add and subtract decimals with a different number of decimal places e.g. 98.4 – 9.7*
			• Round decimals with two decimal places to the nearest whole number and to one decimal place
			• Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents *e.g. $^{782}/_{1000}$ = $^7/_{10}$ + $^8/_{100}$ + $^2/_{1000}$*
			• Read, write, order and compare numbers with up to three decimal places *e.g. put these decimals in order starting from the smallest: 0.471, 0.46, 0.4, 0.465, 0.5*
			• Solve problems *and puzzles* involving number up to three decimal places, *checking the reasonableness of answers*

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		decimal fraction • *Recognise that percentages are proportions of quantities as well as operators on quantities* • Solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25.*e.g. $^{12}/_{20} = ^{60}/_{100} = 0.6 = 60\%$*	• Recognise the per cent symbol (%) and understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator hundred, and as a decimal fraction • *Recognise that percentages are proportions of quantities e.g. 30% voted 'yes', 45% voted 'no' and the rest did not vote; what percentage did not vote? as well as operators on quantities e.g. find 45% of 160* • Solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25. *e.g. John ate $^4/_5$ of a 20cm jelly snake; Jane ate 0.7 of her 20cm jelly snake; how much more has John eaten?*
MEASUREMENT	• Convert between different units of measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) *e.g. 15.7cm = 157mm* • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres *e.g. find the perimeter of an L shape where one or two side lengths are not given* • Calculate and compare the area of squares and rectangles including using	• Convert between different units of measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) *e.g. 3.7 litres = 3700ml* • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres *e.g. given the perimeter and length of a rectangle, calculate its width,w, expressing it algebraically e.g. 20 =*	• Convert between different units of measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) *e.g. 2.2m = 2200mm* • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • Calculate and compare the area of squares and rectangles including using standard units, square

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standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes

- Use all four operations to solve problems involving measure *(e.g. length, mass, volume, money)* using decimal notation including scaling

(2×7) + 2w

- Calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes
- Estimate volume *e.g. using $1cm^3$ blocks to build cubes and cuboids* and capacity *e.g. using water*
- Solve problems involving converting between units of time *e.g. write these lengths of time in order, starting with the smallest: 250sec, 90min, ½ hour, 4min*
- Use all four operations to solve problems involving measure *(e.g. length, mass, volume, money)* using decimal notation including scaling

centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes *e.g. investigate possible rectangles with the same area as a particular square*

- Estimate volume *e.g. using $1cm^3$ blocks to build cubes and cuboids* and capacity *e.g. using water*
- Solve problems involving converting between units of time *e.g. three children share a trophy for 8 weeks and 4 days; they each have it for the same length of time; how long does each child keep the trophy?*
- Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling
- *Calculate the area of scale drawings using given measurements. e.g. calculate the area of a 5cm × 3cm garden on a scale drawing with a scale 1cm:2m ($60m^2$)*
- Understand and use equivalences between metric and common imperial units such as inches, pounds and pints *e.g. Given that an inch is approximately 2.5cm, calculate the metric equivalent of a foot (12 inches)*

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GEOMETRY			
Properties of shapes	- Identify 3-D shapes, including cubes and other cuboids, from 2-D representations *e.g. using isometric paper* *Draw lines accurately to the nearest millimetre and use conventional markings for parallel lines and right angles.* - Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles - Use the properties of rectangles to deduce related facts and find missing lengths and angles *e.g. all angles are right angles, diagonals are congruent (same length) and bisect each other (divide into two equal parts), one diagonal separates the rectangle into two congruent triangles…*	- Identify 3-D shapes, including cubes and other cuboids, from 2-D representations *Draw lines accurately to the nearest millimetre and use conventional markings for parallel lines and right angles.* - Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles - Draw given angles, and measure them in degrees (°) - Identify: - angles at a point and one whole turn (total 360°) - angles at a point on a straight line and ½ a turn (total 180°) - other multiples of 90° *Use angle sum facts and other properties to make deductions about missing angles* - Use the properties of rectangles to deduce related facts and find missing lengths and angles *e.g. all angles are right angles, diagonals are congruent (same length) and bisect each other (divide into two equal parts), one diagonal separates the rectangle into two congruent triangles…* *Use the term diagonal and make conjectures about the angles formed*	- Identify 3-D shapes, including cubes and other cuboids, from 2-D representations *Draw lines accurately to the nearest millimetre and use conventional markings for parallel lines and right angles.* - Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles - Draw given angles, and measure them in degrees (°) - Identify: - angles at a point and one whole turn (total 360°) - angles at a point on a straight line and ½ a turn (total 180°) - other multiples of 90° *Use angle sum facts and other properties to make deductions about missing angles* - Use the properties of rectangles to deduce related facts and find missing lengths and angles *e.g. all angles are right angles, diagonals are congruent (same length) and bisect each other (divide into two equal parts), one diagonal separates the rectangle into two congruent triangles…* *Use the term diagonal and make conjectures about the angles formed*

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		by diagonals and sides, and other properties of quadrilaterals, e.g. using dynamic geometry ICT tools.	*by diagonals and sides, and other properties of quadrilaterals, e.g. using dynamic geometry ICT tools.* • Distinguish between regular and irregular polygons based on reasoning about equal sides and angles *e.g. sort triangles and quadrilaterals into regular and irregular sets, realising that only the equilateral triangles and the squares are regular*
Position and direction	• Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.	• Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.	• Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.
STATISTICS			
Use and interpret data	• Complete, read and interpret information in tables, including timetables.	• Complete, read and interpret information in tables, including timetables. • Solve comparison, sum and difference problems using information presented in a line graph *e.g. on a distance-time graph, how long did it take to travel a particular distance?* • *Connect work on coordinates and scales to their interpretation of time graphs*	• Complete, read and interpret information in tables, including timetables. • Solve comparison, sum and difference problems using information presented in line graphs • *Connect work on coordinates and scales to their interpretation of time graphs* • *Begin to decide which representations of data are most appropriate and why*

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Year 6			
Year 6	**Autumn**	**Spring**	**Summer**
NUMBER			
Number and place value	• Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit *e.g. What must be added to 26 523 to change it to 54 525?* • Round any whole number to a required degree of accuracy *e.g. round 265 496 to the nearest 10 000 (270 000)* • Solve number and practical problems that involve number, place value and rounding *e.g. What is the largest 5-digit number whose digits sum to 20? (99200).*	• Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit • Round any whole number to a required degree of accuracy *e.g. Give an example of a number which you might round to the nearest 10? Nearest 10 000?* • Use negative numbers in context, and calculate intervals across zero *e.g. how much warmer is 5°C than -4°C? (9°C)* • Solve number and practical problems that involve number, place value and rounding *e.g. What is the smallest number which rounds to 35 000, to the nearest 1000? (34 500).*	• Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit • Round any whole number to a required degree of accuracy *e.g. What is the smallest number which rounds to 500 000, to the nearest 1000? (499 500).* • Use negative numbers in context, and calculate intervals across zero • Solve number and practical problems that involve number, place value and rounding *e.g. What is the smallest 4-digit integer whose digits sum to 20? (10199).*
Addition, subtraction, multiplication and division	• *Continue to use all the multiplication tables to 12 × 12 in order to maintain their fluency e.g. 84÷12* • *Continue to practise the four operations for larger numbers using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division* • Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication	• *Continue to use all the multiplication tables to 12 × 12 in order to maintain their fluency* • *Continue to practise the four operations for larger numbers using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division* • Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication	• *Continue to use all the multiplication tables to 12 × 12 in order to maintain their fluency* • *Continue to practise the four operations for larger numbers using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division* • Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

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• Perform mental calculations, including with mixed operations and large numbers *e.g. (13 500 × 2) ÷ 9 = 3000*	• Perform mental calculations, including with mixed operations and large numbers	• Perform mental calculations, including with mixed operations and large numbers e.g. *(13 400 + 10 600) × 4 ÷ 12 = 8000*
• Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why *e.g. There are 6534 cars parked in a 3-storey car park; 1398 are on the first floor and 3765 are on the second floor; how many cars are parked on the third floor?*	• Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why *e.g. Three people won £365 496 on the lottery; one received £197 540, another received £40 010; how much did the third person receive?*	• Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why *e.g. Write a number story for this number sentence: 23.5 = 20.4 + 4.9 - 1.8*
• Solve problems involving addition, subtraction, multiplication and division *e.g. 396 children and 37 adults went on a school trip; buses seat 57 people; how many buses were needed?*	• Solve problems involving addition, subtraction, multiplication and division *e.g. I think of a number and subtract 5.6 from it then multiply the result by 6; the answer is 7.2; what was my number?*	• Solve problems involving addition, subtraction, multiplication and division *e.g. Club A sold 3500 tickets for £9.50 each and Club B sold 8150 tickets for £3.50; how much more money did Club A make than Club B?*
• Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy. e.*g. find the perimeter of a football pitch with side lengths 105.3m and 46.8m (estimate: (105+45)×2=300m; actual: (105.3+46.8)×2=304.2m (same number of decimal places as numbers in the question)*	• Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy *e.g. A box contains approximately 52 matches; how many boxes can be filled with 10 000 matches?*	• Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
• Identify common factors, common multiples and prime numbers *e.g. common factors of 12 and 15 are 1 and 3; common multiples of 4 and 6 are 12, 24, 36…; prime numbers are numbers with exactly 2 factors e.g. 2, 3, 5, 7, 11,*	• Identify common factors, common multiples and prime numbers *e.g. Find the smallest common multiple of 5, 6 and 8 (120)*	• Identify common factors, common multiples and prime numbers *e.g. Find the highest common factor of 120, 90 and 75 (15) or Find all the prime numbers between 80 and 100.*
	• Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context	• Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
		• Use their knowledge of the order of operations to carry out calculations

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	13, …	• Use their knowledge of the order of operations to carry out calculations involving the four operations *and using brackets; e.g. 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9.*	involving the four operations *and using brackets e.g. 14 x (29 – 12) + 7 = 245*
FRACTIONS			
Fractions (including decimals and percentages)	• Use common factors to simplify fractions *e.g. as the numerator and denominator have a common factor of 4, $^{12}/_{16}$ can be simplified to $^3/_4$;* use common multiples to express fractions in the same denomination *e.g. as the denominators have a common multiple of 12, $^3/_4$ and $^5/_6$ can both be expressed in twelfths i.e. $^9/_{12}$ and $^{10}/_{12}$ respectively* • *List equivalent fractions to identify fractions with common denominators* • Compare and order fractions, including fractions >1 *e.g. put these fractions in order from the smallest: $^5/_4, ^5/_8, ^3/_2, ^{14}/_8$* • Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places *e.g. 205.6 ÷ 100 =2.056* • Multiply one-digit numbers with up to two decimal places by whole numbers *e.g. 0.6 x 7* • Recall and use equivalences between simple fractions, decimals and	• Use common factors to simplify fractions; use common multiples to express fractions in the same denomination • *List equivalent fractions to identify fractions with common denominators* • Compare and order fractions, including fractions >1 *e.g. put these fractions in order from the smallest: $^5/_4, ^5/_6, ^3/_2, ^4/_3$* • Associate a fraction with division and calculate decimal fraction equivalents *e.g. 0.375* for a simple fraction *e.g. $^5/_8$* • *Use understanding of relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity e.g. if ¼ of a length is 36cm, then the whole length is 36 × 4 = 144cm* • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions *e.g. $^1/_2 + ^1/_8 = ^5/_8$*	• Use common factors to simplify fractions; use common multiples to express fractions in the same denomination • *List equivalent fractions to identify fractions with common denominators* • Compare and order fractions, including fractions >1 *e.g. put these fractions in order from the smallest: $^5/_4, ^5/_6, ^3/_5, ^4/_3$* • Associate a fraction with division and calculate decimal fraction equivalents *e.g. 0.375* for a simple fraction *e.g. $^5/_8$* • *Use understanding of relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity e.g. if $^1/_5$ of a mass is 150g, then the whole mass is 150 × 5 = 750g* • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions *e.g. $1^3/_4 - ^5/_6 = ^{11}/_{12}$*

	percentages, including in different contexts *e.g. order* $^4/_5$ *, 75%, 0.9,* $^{19}/_{20}$	• Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places *e.g.* $\times 100 = 140.8$ • Multiply one-digit numbers with up to two decimal places by whole numbers *e.g. 0.06 x 8* • Use written division methods in cases where the answer has up to two decimal places *e.g. 458 ÷ 8 = 57.25* • *Multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers e.g. 3.15 × 62* • Solve problems which require answers to be rounded to specified degrees of accuracy *and check the reasonableness of answers.*Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. *e.g. find a fraction which lies between 0.4 and 0.5*	• *Use a variety of images to support understanding of multiplication with fractions* • Multiply simple pairs of proper fractions, writing the answer in its simplest form e.g. ¼ × $^1/_2$ = $^1/_8$ • Divide proper fractions by whole numbers e.g. $^1/_3$ ÷ 2 = $^1/_6$ • Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places *e.g.* ÷ 1000 = 0.45 • Multiply one-digit numbers with up to two decimal places by whole numbers *e.g. 0.04 x 12* • Use written division methods in cases where the answer has up to two decimal places *e.g. 693 ÷ 15 = 14.2* • *Multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers e.g. 93.15 ÷ 5* • Solve problems which require answers to be rounded to specified degrees of accuracy *and check the reasonableness of answers.* • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts *e.g. find a decimal which lies between* $^3/_8$ *and ½*

Ratio and proportion	• Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts *e.g. adjust a recipe for 4 people, to serve 20 people*	• Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts *e.g. adjust a recipe for 4 people, to serve 6 people* • Solve problems involving similar shapes where the scale factor is known or can be found *e.g. two rectangular picture frames are the same shape, but one is bigger than the other; the smaller one measures 10cm by 15cm; the larger frame has a width of 30cm, what is its length?* • *Begin to use the notation a : b to record ratio* • Solve problems involving the calculation of percentages (e.g. measures) such as 15% of 360 and the use of percentages for comparison • *Link percentages of 360° to calculating angles of pie charts* • Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples *e.g. for every egg you need three spoons of flour; how many eggs are needed for 12 spoons of flour?*	• Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts *e.g. adjust a recipe for 6 people, to serve 15 people* • Solve problems involving similar shapes where the scale factor is known or can be found *e.g. On a map 2cm represents 1km; a road measures 7cm on the map, how long is it in real life?* • *Use the notation a : b to record ratio* • Solve problems involving the calculation of percentages (e.g. measures) such as 15% of 360 and the use of percentages for comparison • *Link percentages of 360° to calculating angles of pie charts* • Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples *e.g. the ratio of boys to girls in class 6 is 1:2; there are 8 boys, how many girls are there?.*

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Algebra	• *Use symbols and letters to represent variables and unknowns in mathematical situations…*
	
	  o *missing numbers, lengths, coordinates and angles e.g. 3x=24 or the angles in a triangle are 35°, 120° and y°; find y*
	
	  o *mathematics and science formulae e.g. A=l×w*
	  o *arithmetic rules e.g. a+b=b+a*
	
	• Express missing number problems algebraically *e.g. 17 = x + 4.5*
	• *U*se simple formulae expressed in words *e.g. write a formula for the number of months, m, in y years. (y=12m)*
	• Enumerate all possibilities of combinations of two variables *e.g. investigate how many different ways 2 red eggs can be placed in a 6-space egg carton, by starting with a 3-space carton, 4-space carton etc?*
		• *Use symbols and letters to represent variables and unknowns in mathematical situations…*
		
		  o *missing numbers, lengths, coordinates and angles e.g. 5y+1=16 or the angles in an isosceles triangle are 50°, y° and y°; find y*
		  o *mathematics and science formulae e.g. P=2(l+w)*
		  o *arithmetic rules e.g. a×b=b×a*
		  o *generalising number patterns e.g. 3, 6, 9, 12, … 3n*
		  o *number puzzles e.g. a+b=8.5 and a×6=15; find a and b*
		
		• Express missing number problems algebraically *e.g. the perimeter of a triangle is 20cm; it has two sides of length 8cm; what is the length of the other side? (20=2×8+x so x=4cm)*
		• Use simple formulae expressed in words *e.g. write a formula for the cost of a party, C, which costs £100 plus £2 per person, n. (C=100+2n)*
		• Enumerate all possibilities of combinations of two variables *e.g. investigate all possible half-time scores when the full time score of a football match is 4:2*
		• Generate and describe linear number sequences *e.g. write the first 5 terms in*
			• *Use symbols and letters to represent variables and unknowns in mathematical situations…*
			
			  o *missing numbers, lengths, coordinates and angles e.g. 68=6t-4 or the angles in a kite are x°, x°, 15° and 53°; find x, or plot points (x, y) where x+y=10*
			  o *mathematics and science formulae e.g. A=½(l×h)*
			  o *arithmetic rules*
			  o *generalising number patterns e.g. 6, 11, 16, 21, … 5n+1*
			  o *number puzzles e.g. x+y=10 and 2x+y=13; find x and y*
			
			• Express missing number problems algebraically *e.g. I'm thinking of a number; I double it and subtract 12 from the result; the answer is 60; what was my number? (2x-12=60, so 2x=72, so x=36)*
			• Use simple formulae expressed in words *e.g. write a formula for the cost of a taxi journey, C, which is £2.10 plus £1.60 per kilometre, k. (C=2.10+1.60k)*
			• Enumerate all possibilities of combinations of two variables *e.g. list all the combinations of boys and girls in a class where there are twice as many boys as girls and between 25 & 35 children in the class altogether.*

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		a 'decrease by 9' sequence starting from 20, or find the nth term of a simple sequence e.g. 4, 8, 12, 16, … 4n • Find pairs of numbers that satisfy number sentences involving two unknowns. *e.g. a – b = 5, give pairs of values that a and b could have (e.g. 8, 3 or 6.5, 1.5 or …) or. p×q=24; if p and q are both positive, even numbers, list all the possible combinations (e.g. 2×12, 4×6, …)*	• Generate and describe linear number sequences *e.g. 6, 13, 20, 27, … 7n-1* • Find pairs of numbers that satisfy number sentences involving two unknowns. *e.g. a – b = 5, give pairs of values that a and b could have (e.g. 8, 3 or 6.5, 1.5 or …)*

MEASUREMENT			
Measurement	• Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to three decimal places *e.g. 4.52kg = 4520g; 1.005km = 1005m* • Recognise that shapes with the same areas can have different perimeters and vice versa *e.g. investigate rectangles with areas of 24cm² to find which has the smallest perimeter* • Recognise when it is possible to use formulae for area of shapes *e.g. find the length of rectangle which is 4m wide and has the same area as a square with a side length of 8cm.*	• Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to three decimal places • Recognise that shapes with the same areas can have different perimeters and vice versa *e.g. investigate triangles with areas of 12cm² to find which has the smallest perimeter* • Recognise when it is possible to use formulae for area and volume of shapes *e.g. find the length of the side of a cube with a volume of 27cm³* • Calculate the area of parallelograms and triangles, *relating it to the area of*	• Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to three decimal places • Recognise that shapes with the same areas can have different perimeters and vice versa *e.g. investigate parallelograms with areas of 24cm² to find which has the smallest perimeter* • Recognise when it is possible to use formulae for area and volume of shapes *e.g. find the height of cuboid which is 12cm long, 2cm high and has the same volume as a cube with sides of 6cm*

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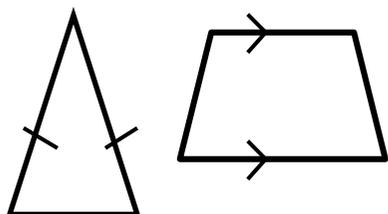|		
	• Calculate the area of triangles, *relating it to the area of rectangles, e.g. compare the 'counting squares' method to using the formula for the area of a triangle*	*rectangles*, *e.g. compare the 'counting squares' method to using the formula for the area of a parallelogram* • Solve problems involving the calculation and conversion of units of measure, using decimal notation to three decimal places where appropriate *e.g. Ben walked 850m to the bus stop, travelled on a bus for 8.67km and then a train for 120.9km; how far did he travel altogether?* • Convert between miles and kilometres *and other units commonly used e.g. know that a mile is approximately 1.6km (and 1km is approximately 0.6miles) and use this to make rough calculations* • Calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3) and extending to other units, such as mm^3 and km^3.	• Calculate the area of parallelograms and triangles, *relating it to the area of rectangles* • Solve problems involving the calculation and conversion of units of measure, using decimal notation to three decimal places where appropriate *e.g. A jug holds 550ml; how may jugs of water are needed to fill a 4.8 litre bucket?* • convert between miles and kilometres *and other units commonly used e.g. use a conversion line graph or be able to work out that 6 pints of milk is a bit more than 3 litres* • calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3) and extending to other units, such as mm^3 and km^3. • *Begin to use compound units for speed e.g. miles per hour*

GEOMETRY			
Properties of shapes	• Draw 2-D shapes using given dimensions and angles *using measuring tools and conventional markings and labels for lines and angles e.g. same length lines, parallel lines and same size angles:* • Recognise, describe and build simple 3-D shapes, including making nets *e.g. investigate different nets for a cube, recognising when 'nets' will fold to make a cube and when they will not.*	• Draw 2-D shapes using given dimensions and angles *using measuring tools and conventional markings and labels for lines and angles e.g. complete a triangle with given lengths and angles* • Recognise, describe and build simple 3-D shapes, including making nets *e.g. visualise 3-D shapes drawn on isometric paper and begin to draw 2-D representations of 3-D shapes* • Compare and classify geometric shapes based on their properties and sizes (*e.g. parallel sides, line symmetry, types of angles etc)* and find unknown angles in any triangles, quadrilaterals, and regular polygons • Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles *describing them algebraically e.g. a=180-(b+c).*	• Draw 2-D shapes using given dimensions and angles *using measuring tools and conventional markings and labels for lines and angles e.g. construct a triangle or complete a parallelogram with given lengths and angles* • Recognise, describe and build simple 3-D shapes, including making nets • Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles *describing them algebraically e.g. a=180-(b+c)* • Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius *describing it algebraically as d=2×r*

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Position and direction	• Describe positions on the full coordinate grid (all four quadrants) *e.g. (-3, 7)* • Draw and translate simple shapes on the coordinate plane, and reflect them in the axes. • *Predict missing coordinates of quadrilaterals by using the properties of shapes, which may be expressed algebraically e.g. translating vertex (a, b) to (a-2, b+3), or find the other vertices of a square, given two of them are (a, b) and (a+d, b+d)*	• Describe positions on the full coordinate grid (all four quadrants) • Draw and translate simple shapes on the coordinate plane, and reflect them in the axes. • *Predict missing coordinates of quadrilaterals by using the properties of shapes, which may be expressed algebraically e.g. translating vertex (a, b) to (a-2, b+3), or find the other vertices of a square, given two of them are (a, b) and (a+d, b+d)*	• Describe positions on the full coordinate grid (all four quadrants) • Draw and translate simple shapes on the coordinate plane, and reflect them in the axes. • *Predict missing coordinates of quadrilaterals by using the properties of shapes, which may be expressed algebraically e.g. translating vertex (a, b) to (a-2, b+3), or find the other vertices of a square, given two of them are (a, b) and (a+d, b+d)* • *Draw and label a pair of axes in all four quadrants with equal scaling.*
STATISTICS			
Use and interpret data	• Interpret and construct pie charts and line graphs and use these to solve problems *e.g. draw a pie chart to show how Jack spends his £36 birthday money:* o *£9 snacks* o *£15 toys* o *£12 books* • *Encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects e.g. a scattergraph connecting heights of children and their long-jump distance*	• Calculate and interpret the mean as an average. *e.g. find the mean height of these children: 1.2m, 1.07m and 1.12m* • Interpret and construct pie charts and line graphs and use these to solve problems *e.g. create a conversion graph for pounds and Euros* • *Encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects.*	• Calculate and interpret the mean as an average. • Interpret and construct pie charts and line graphs and use these to solve problems *e.g. connect conversion from kilometres to miles in measure to its graphical representation.* • *Encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects.*

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