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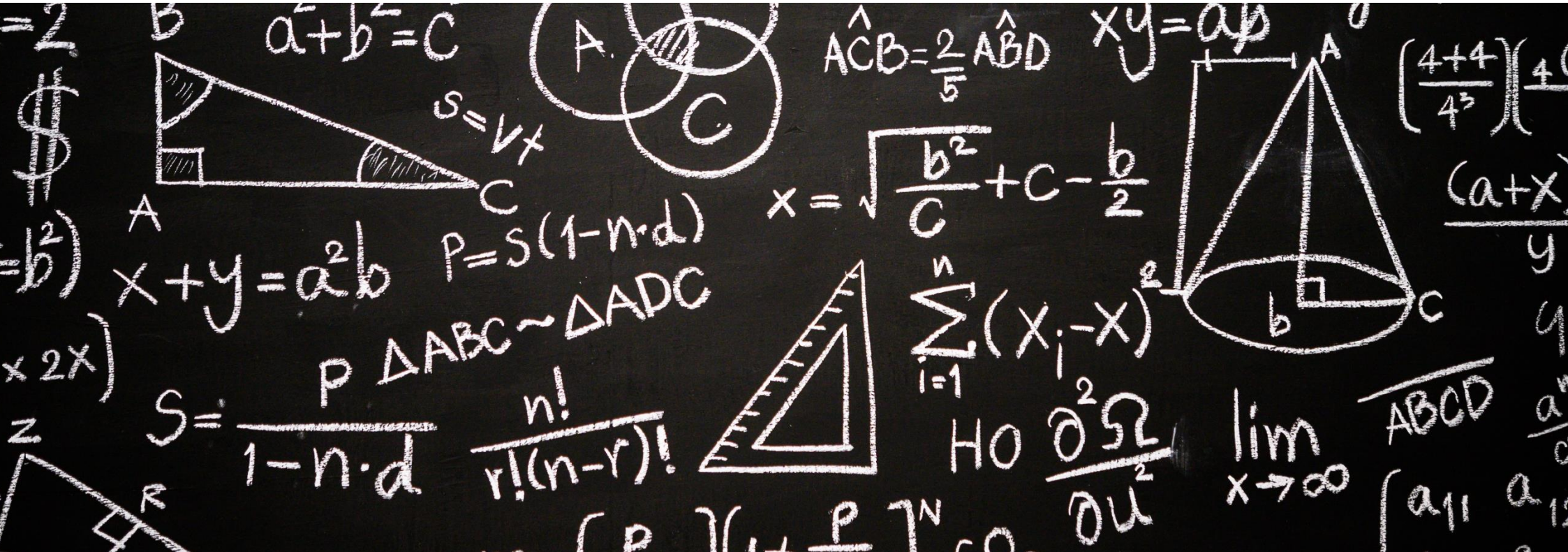
Gateshead Core Curriculum

Year 6



Review of Learning

In order to ensure that the curriculum meets the learning needs of the class, it is vital that there is an accurate picture of previous teaching and coverage. Last year's class teacher and the new teacher (including the maths subject leader or SLT where appropriate/possible) should work together to look at which objectives from the maths curriculum were taught during the previous year and were understood fully. It may be decided that some objectives from the previous year's curriculum may need to be consolidated and so an additional column has been added to the Gateshead Core Curriculum containing the previous year's objectives. These can be highlighted accordingly to indicate if further consolidation is required throughout the next academic year. Following discussion as to how these objectives will need to be consolidated, they can then be inserted into an appropriate place in the new year's curriculum.

Additional objectives have been included in this document. These are the Ready to Progress Criteria from the DfE June 2020 Non-Statutory Guidance for the National Curriculum in England (https://www.gov.uk/government/publications/teaching-mathematics-in-primary-schools). For ease of identification, these are in a red font colour.

In some instances, objectives may appear in all three terms. It is not the intention that these objectives are to be taught in each term but for the class teacher to consider the appropriateness of them. It may be that the teacher has taught the objective in the autumn and spring terms and assessment demonstrates that the children have a deep understanding of the objective. In this case, the class teacher may choose not to dedicate a full lesson of teaching but may chose a "lighter touch" to ensure retrieval of this objective is strong. Conversely, the class teacher may choose not to teach an objective in the autumn term due to focusing on other areas. In this case it would be imperative that the objectives were taught fully in the next two terms. Again, class teachers may identify that children require the objectives to be taught in all three terms and further consolidation of learning.

These documents are intended to be flexible and support class teachers in designing a flexible and personalised curriculum for their class.

Reasoning and Problem Solving

There is the expectation that **all** units of mathematics will include elements of reasoning and problem solving. Therefore, the following objectives have been removed from the progression grid as they could be equally applied to all areas of mathematics

- *Apply understanding to solve* **number problems and practical problems** *and puzzles involving numbers, money, shape or measures.*
- *Explain methods and reasoning orally and in writing, including using diagrams and symbols.*
- *Explore and discuss patterns, properties and relationships that arise in the number system using appropriate mathematical vocabulary.*
- *Develop lines of enquiry through conjecturing relationships and generalisations and testing ideas. Identify examples for which a statement is true or false.*
- *Solve calculation problems using information from a range of table and charts.*
- *Apply measuring skills to an appropriate degree of accuracy, alongside the skills of thinking mathematically to solve problems. These should include practical problems and might involve construction of shapes or artefacts, often in a cross curricular context.*
- *Make and explain connections between number, measures and shape.*
- *Explain solutions orally or using writing, diagrams, practical materials or dynamic geometry ICT tools.*
- *Apply the skills of collecting, representing and interpreting statistical data across the curriculum within and beyond mathematic, sometimes in response to an enquiry of interest to and suggested by pupils*

educationGateshead Core Curriculum for Primary Mathematics Progression Grid Year 6

Consolidation from Year 5	Year 6 Autumn	Year 6 Spring	Year 6 Summer
These are the objectives from Year 5. Some of these objectives may need consolidation in Year 6 depending on discussion with sending teacher.	**Understanding and investigating with numbers** **3 weeks**	**Understanding and investigating with numbers** **3 weeks**	**Understanding and investigating with numbers** **3 weeks**
Place value, ordering and rounding	**Place value, ordering and rounding**	**Place value, ordering and rounding**	**Place value, ordering and rounding**
• **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, including through zero.** *Order a given set of negative and positive integers.* • **Read, write, order and compare numbers to at least 1 000 000 and determine the** place **value of each digit.** Continue to use numbers in contexts including measurement. • 5NPV–1 Know that 10 tenths are equivalent to 1 one, and	• *Continue to count forwards or backwards in steps of powers of 10 from any given number up to 10 000 000.* • **Use,** *interpret and order,* **negative numbers in context, and calculate intervals across zero.** • **Read, write,** say**, order and compare numbers up to 10 000 000 and determine the value of each digit.** *Continue to use numbers in contexts including measurement.* • • *Continue to extend and apply understanding of the number system to decimal numbers and fractions* • 6NPV–1 Understand the relationship between powers of	• **Use,** *interpret and order,* **negative numbers in context, and calculate intervals across zero.** • **Read, write,** say**, order and compare numbers up to 10 000 000 and determine the value of each digit.** *Continue to use numbers in contexts including measurement.* • *Continue to extend and apply understanding of the number system to decimal numbers and fractions* • *Continue to read Roman numerals to 1 000 (M) and recognise years written in Roman numerals. Appreciate the difference between the Roman numeral system and our own*	• 6NPV–4 Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts. • Using a number line add and subtract positive and negative integers for measures such as temperature**.** • *Continue to extend and apply understanding of the number system to decimal numbers and fractions* • *Use the vocabulary of comparing and ordering numbers including use of >, < symbols and = sign.* • **Round any whole number to a required degree of accuracy**

that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01. • Extend and apply understanding of the number system to decimal numbers and fractions • 5NPV–2 Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and nonstandard partitioning. • 5NPV–3 Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each. • *Use the vocabulary of comparing and ordering*	10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000). • 6NPV–2 Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and nonstandard partitioning. • *Use the vocabulary of comparing and ordering numbers including use of >, < symbols and = sign.* • **Round any whole number to a required degree of accuracy**	*number system from a place value viewpoint.* • **Round any whole number to a required degree of accuracy** • 6NPV–3 Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts.	

numbers including use of >, < symbols and = sign. • **Read Roman numerals to 1 000 (M) and recognise years written in Roman numerals.** *Appreciate the difference between the Roman numeral system and our own number system from a place value viewpoint.* • **Round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 and 100 000.** • *Apply understanding of the number system to solve* **number problems and practical problems** *and puzzles involving numbers, money or measures. Explain methods and reasoning orally and in writing, including using diagrams and symbols.*			
Properties of numbers and number sequences	**Properties of numbers and number sequences**	**Properties of numbers and number sequences**	**Properties of numbers and number sequences**
• *Continue to practise to recognise multiples of numbers up to 12 x 12, to*	• Continue to use all the multiplication tables to calculate	• Continue to use all the multiplication tables to calculate	• **Identify common factors, common multiples, prime**

recognise patterns in sequences of multiples and connections between them. Know and apply tests of divisibility. • 5NF–1 Secure fluency in multiplication table facts, and corresponding division facts, through continued practice. • **Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.** *Identify common multiples.* • 5MD–2 Find factors and multiples of positive whole numbers, including common factors and common multiples, and express a given number as a product of 2 or 3 factors. • **Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.** • Recognise and describe linear number sequences, including those involving fractions and decimals and find the term to term rule	mathematical statements in order to maintain fluency. • **Identify common factors, common multiples, prime numbers, *squared and cubed numbers.*** • Relate common factors to the finding of equivalent fractions.	mathematical statements in order to maintain fluency. • **Identify common factors, common multiples, prime numbers, *squared and cubed numbers.*** • Relate common factors to the finding of equivalent fractions. • *Continue to recognise and describe linear number sequences, including those involving fractions and decimals and find the term to term rule.*	**numbers, *squared and cubed numbers.*** • Relate common factors to the finding of equivalent fractions. • *Continue to recognise and describe linear number sequences, including those involving fractions and decimals and find the term to term rule.*

• **Establish whether a number up to 100 is prime and recall prime numbers up to 19.** • **Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}).** • Use understanding of the terms factor, multiple and prime, square and cube numbers to construct equivalence statements (e.g. 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 = 9^2 x 10). • *Apply understanding of number properties to solve routine and non-routine problems and puzzles involving numbers, money or measure.* • *Explore and discuss patterns, properties and relationships that arise in the number system using appropriate mathematical vocabulary.* • *Develop lines of enquiry through conjecturing relationships and generalisations and testing ideas. Identify examples for which a statement is true or false.*			

Fractions decimals and percentages	Fractions decimals and percentages	Fractions decimals and percentages	Fractions decimals and percentages
• Continue to develop understanding of fractions as numbers, measures and operators by finding, *naming and writing*, fractions of numbers and quantities. • 5F–1 Find non-unit fractions of quantities. • Extend and apply understanding of the number system to decimal numbers and fractions • **Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.** • 5F–2 Find equivalent fractions and understand that they have the same value and the same position in the linear number system. • **Recognise mixed** • **Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (e.g. $^{2}/_{5} + {}^{4}/_{5} = {}^{6}/_{5} = 1{}^{1}/_{5}$).** • Connect equivalent fractions > 1 that simplify to integers	• **Use common factors to simplify fractions; use common multiples to express fractions in the same denomination** • 6F–1 Recognise when fractions can be simplified, and use common factors to simplify fractions • **Compare and order fractions, including fractions > 1** • **Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.** Practise, use and understand addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator. They should start with fractions where the denominator of one fraction is a multiple of the other (for example ½ + 1/8 = 5/8) and progress to varied and increasingly complex problems. • Use understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit	• **Use common factors to simplify fractions; use common multiples to express fractions in the same denomination** • **Compare and order fractions, including fractions > 1** • 6F–2 Express fractions in a common denomination and use this to compare fractions that are similar in value. • 6F–3 Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy. • **Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions** • **Multiply simple pairs of proper fractions, writing the answer in its simplest form (for example ¼ x ½ = 1/8).** Use a variety of images to support their understanding of	• **Multiply simple pairs of proper fractions, writing the answer in its simplest form (for example ¼ x ½ = 1/8).** Use a variety of images to support their understanding of multiplication with fractions. Make links with earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, for example parts of a rectangle. • Use understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example if ¼ of a length is 36cm, then the whole length is 36 x 4 = 144cm). • **Divide proper fractions by whole numbers (for example 1/3 ÷ 2 = 1/6)** • Practise calculations with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions

with division and other fractions > 1 to division with remainders, using the number line and other models, and hence move from these to improper and mixed fractions • Continue to practise counting forwards and backwards using fractions and decimals, including bridging through zero, for example on a number line. • **Read and write decimal numbers as fractions (e.g. 0.71 = $^{71}/_{100}$).** • 5F–3 Recall decimal fraction equivalents for ½ ,1/4 , 1/5 and 1/10 , and for multiples of these proper fractions. • **Recognize and use thousandths and relate them to tenths, hundredths, decimal equivalents** and measures. • **Round decimals with two decimal places to the nearest whole number and to one decimal place.** • 5NPV–4 Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.	fraction to find the whole quantity (for example if ¼ of a length is 36cm, then the whole length is 36 x 4 = 144cm). • **Associate a fraction with division and calculate decimal equivalents (for example, 0.375) for a simple fraction (for example 3/8)** • Practise calculations with simple fractions and decimal fraction equivalents to aid fluency, • including listing equivalent fractions to identify fractions with common denominators • **Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places** • **Solve problems which require answers to be rounded to specified degrees of accuracy** and check reasonableness of answers. • Develop skills of rounding and estimating as a means of predicting and checking the order of magnitude of answers to decimal calculations.	multiplication with fractions. Make links with earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, for example parts of a rectangle. • Use understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example if ¼ of a length is 36cm, then the whole length is 36 x 4 = 144cm). • **Divide proper fractions by whole numbers (for example 1/3 ÷ 2 = 1/6)** • **Associate a fraction with division and calculate decimal equivalents (for example, 0.375) for a simple fraction (for example 3/8)** • Explore and make conjectures about converting a simple fraction to a decimal fraction (for example, 3 ÷ 8 = 0.375). For simple fractions with recurring decimal	with common denominators • Explore and make conjectures about converting a simple fraction to a decimal fraction (for example, 3 ÷ 8 = 0.375). For simple fractions with recurring decimal equivalents pupils learn about rounding the decimal to three decimal places or other appropriate approximations depending on the context. • **Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places** • Start to multiply and divide decimals starting with simpler cases e.g. 0.4 x 2 = 0.8 or division of decimal numbers by one-digit whole numbers, in practical contexts involving measures or money. Recognise division calculations as the inverse of multiplication. • **Multiply one-digit numbers with up to two decimal places by whole numbers** up to two digits**.**

• **Read, write, order and compare numbers with up to three decimal places.** • *Apply understanding of fractions, decimals up to three places and percentages to solve routine and non-routine problems and puzzles involving numbers, shapes, money or measures. Explain methods and reasoning orally and in writing, including using diagrams and symbols.* • **Compare and order fractions whose denominators are all multiples of the same number.** • **Add and subtract fractions with the same denominator and with denominators that are multiples of the same number** extending to calculations that exceed 1 as a mixed number. • Add and subtract decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 (e.g.0.83+ 0.17 =1) *using formal written methods when appropriate.*	• **Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.** • **Multiply one-digit numbers with up to two decimal places by whole numbers** up to two digits. • Divide numbers with up to two decimal places by whole numbers up to two digits. • **Use written division methods in cases where the answer has up to two decimal places.**	equivalents pupils learn about rounding the decimal to three decimal places or other appropriate approximations depending on the context. • **Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places** • Start to multiply and divide decimals starting with simpler cases e.g. 0.4 x 2 = 0.8 or division of decimal numbers by one-digit whole numbers, in practical contexts involving measures or money. Recognise division calculations as the inverse of multiplication. • **Multiply one-digit numbers with up to two decimal places by whole numbers** up to two digits. • Divide numbers with up to two decimal places by whole numbers up to two digits. • **Use written division methods in cases where the**	• Divide numbers with up to two decimal places by whole numbers up to two digits. • **Use written division methods in cases where the answer has up to two decimal places.** • **Solve problems which require answers to be rounded to specified degrees of accuracy** and check reasonableness of answers. • **Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.**

• Recognise and describe linear number sequences, including those involving fractions and decimals and find the term to term rule. • **Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.** • Connect multiplication by a fraction to using fractions as operators (fractions of) and to division. This relates to scaling by simple fractions, including fractions > 1. • **Read, write, order and compare numbers with up to three decimal places.** • **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 100 and as a decimal fraction.** • **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.**		**answer has up to two decimal places** • Develop skills of rounding and estimating as a means of predicting and checking the order of magnitude of answers to decimal calculations. • **Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.**	

• Make connections between percentages, fractions and decimals e.g. 100% represents a whole quantity, 1% is 1/100… and relate this to finding 'fractions of'. • Understand that percentages, decimals and fractions are different ways of expressing proportions • 5NPV–5 Convert between units of measure, including using common decimals and fractions.			
Ratio and proportion	**Ratio and proportion**	**Ratio and proportion**	**Ratio and proportion**
N/A	• **Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts** • **Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison** • Solve problems involving unequal quantities, for example 'for every egg you need three spoonfuls of flour', '3/5 of the class are boys'. • **Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.**	• **Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts** • **Solve problems involving the calculation of percentages [for example, of measures, and 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 similar shapes where the**	• **Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts** • **Solve problems involving the calculation of percentages [for example, of measures, and 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 similar shapes where the scale factor is known or can be found.** • Recognise proportionality in contexts where the relations

		scale factor is known or can be found. • Recognise proportionality in contexts where the relations between quantities are in the same ratio (for example, similar shapes and recipes) • Consolidate understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. Use the notation a : b to record work *if appropriate*. • **Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.** • Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts • Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison • 6AS/MD–3 Solve problems involving ratio relationships.	between quantities are in the same ratio (for example, similar shapes and recipes) • Consolidate understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. Use the notation a : b to record work *if appropriate.* • **Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.** • Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts • Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
Algebra	**Algebra**	**Algebra**	**Algebra**

• *use the properties of rectangles to deduce related facts and find* ***missing lengths and angles*** (copied from Geometry: Properties of Shapes)	• Start to use symbols and letters to represent variables and unknowns in *familiar* mathematical situations e.g. ○ Missing numbers, lengths, coordinates and angles ○ Equivalent expressions e.g. a + b = b + a ○ Generalisations of number patterns ○ Number puzzles e.g. what two numbers can add up to. • **Use simple formulae** in maths and science • **Express missing number problems algebraically**	• **Use simple formulae** in maths and science • **Generate and describe linear number sequences** • **Express missing number problems algebraically** • **Find pairs of numbers that satisfy an equation with two unknowns** • **Enumerate possibilities of combinations of two variables.** • 6AS/MD–4 Solve problems with 2 unknowns.	• **Use simple formulae** in maths and science • **Generate and describe linear number sequences** • **Express missing number problems algebraically** • **Find pairs of numbers that satisfy an equation with two unknowns** • **Enumerate possibilities of combinations of two variables.**
Developing and applying calculation	**Developing and applying calculation**	**Developing and applying calculation**	**Developing and applying calculation**
Addition and Subtraction	**Addition and Subtraction 2 weeks**	**Addition and Subtraction 2 weeks**	**Addition and Subtraction 2 weeks**
• *Continue to practise using known facts and understanding of place value to quickly derive sums and differences using whole numbers and decimals.*	• **Perform mental calculations, including with mixed operations,** *appropriate* **large numbers** *and decimals* and more complex calculations.	• **Perform mental calculations, including with mixed operations,** *appropriate* **large numbers** *and decimals* and more complex calculations.	• **Perform mental calculations, including with mixed operations,** *appropriate* **large numbers** *and decimals* and more complex calculations.

• 5NF–2 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth), for example: 8 + 6 = 14 0.8 + 0.6 = 1.4 0.08 + 0.06 = 0.14 • **Add and subtract numbers mentally with increasingly large numbers** e.g. *Use place value and known facts to subtract one near multiple of 1000 from another e.g. 6070 – 4097* or 12 462 – 2300 = 10 162**.** • Mentally add and subtract tenths, and one digit whole numbers and tenths. • *Use and explain a range of mental strategies appropriate to the numbers involved, sometimes supporting explanations with jottings or informal recording.* • **Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).**	• *Use and explain a range of mental strategies appropriate to the numbers involved, sometimes supporting explanations with jottings or informal recording.* • Practise addition and subtraction for larger numbers using the formal written methods of columnar addition and subtraction. • Explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9. • **Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why** • **Solve problems involving addition, subtraction, multiplication and division.** • **Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.** • *Use and explain the equals sign to indicate equivalence, including in missing number problems (e.g. 13 + 24 = 12+ 25; 33 = 55 - Δ).*	• *Use and explain a range of mental strategies appropriate to the numbers involved, sometimes supporting explanations with jottings or informal recording.* • Practise addition and subtraction for larger numbers using the formal written methods of columnar addition and subtraction. • **Use their knowledge of the order of operations to carry out calculations involving the four operations** • **Solve problems involving addition, subtraction, multiplication and division.** • **Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.** • *Use and explain the equals sign to indicate equivalence, including in missing number problems (e.g. 13 + 24 = 12+ 25; 33 = 55 - Δ).*	• **Use their knowledge of the order of operations to carry out calculations involving the four operations** • **Solve problems involving addition, subtraction, multiplication and division.** • **Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.** • *Use and explain the equals sign to indicate equivalence, including in missing number problems (e.g. 13 + 24 = 12+ 25; 33 = 55 - Δ).* • *Use a calculator to solve problems when the numbers involved are appropriate, including decimals, fractions and percentages, and interpret the display correctly for the context.*

• Add and subtract decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 (e.g.0.83+ 0.17 =1) *using formal written methods when appropriate.* • **Add and subtract fractions with the same denominator and with denominators that are multiples of the same number.** • **Use rounding,** *estimation and inverse operations* **to check answers to calculations and determine, in the context of a problem, levels of accuracy.** • *Understand and use the relationships between the four operations and the principles of the arithmetic laws; commutative, associative and distributive. (*Distributivity can be expressed as a(b+c) = ab + ac). • **Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.**			

• *Solve calculation problems using information from a range of table and charts.* • *Apply understanding of number operations to solve number puzzles and non-routine problems and explain reasoning.* • *Use and explain the equals sign to indicate equivalence, including in missing number problems (e.g. 13 + 24 = 12+ 25; 33 = 55 - Δ).*			
Multiplication and Division	**Multiplication and Division 2 weeks**	**Multiplication and Division 2 weeks**	**Multiplication and Division 2 weeks**
• **Multiply and divide numbers mentally drawing upon known facts** *place value and properties of numbers to support mental calculation with larger numbers.* • **Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.** • *Use knowledge of place value and multiplication facts to derive related multiplication and division facts involving decimals e.g. 0.8 x 7, 4.8 ÷ 6.* • 5NF–2 Apply place-value knowledge to known additive and multiplicative	• Continue to use all multiplication tables to calculate mathematical statements to maintain fluency. *Use these to* undertake **mental calculation s** with increasingly **large** *(appropriate)* **numbers, mixed operations** and more complex calculations. • *Continue to use knowledge of place value and multiplication facts to derive related multiplication and division facts involving decimals e.g. 0.8 x 7, 4.8 ÷ 6.* • Explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9.	• *Continue to use knowledge of place value and multiplication facts to derive related multiplication and division facts involving decimals e.g. 0.8 x 7, 4.8 ÷ 6.* • **Use their knowledge of the order of operations to carry out calculations involving the four operations** • **Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication** • **Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division,**	• *Continue to use knowledge of place value and multiplication facts to derive related multiplication and division facts involving decimals e.g. 0.8 x 7, 4.8 ÷ 6.* • **Use their knowledge of the order of operations to carry out calculations involving the four operations** • **Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication** • **Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division,**

number facts (scaling facts by 1 tenth or 1 hundredth), for example: 3 x 4 = 12 0.3 x 4 = 1.2 0.03 x 4 = 0.12 • **Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including** short multiplication and **long multiplication for two-digit numbers.** • 5MD–3 Multiply any whole number with up to 4 digits by any one-digit number using a formal written method. • **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** as fractions, as decimals or by rounding. • 5MD–4 Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders appropriately for the context.	• **Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication** • **Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context** • *Understand and use the relationships between the four operations and the principles of the arithmetic laws; commutative, associative and distributive.* **(**Distributivity can be expressed as a(b+c) = ab + ac). • 6AS/MD–1 Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number). • 6AS/MD–2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse	**and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context** • *Use and explain the equals sign to indicate equivalence, including in missing number problems (e.g. 13 + 24 = 12+ 25; 33 = 55 - Δ).* • *Understand and use the relationships between the four operations and the principles of the arithmetic laws; commutative, associative and distributive.* **(**Distributivity can be expressed as a(b+c) = ab + ac). • *Use rounding, estimation and inverse operations to check answers to calculations and determine, in the context of a problem, levels of accuracy.*	**and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context** • *Use and explain the equals sign to indicate equivalence, including in missing number problems (e.g. 13 + 24 = 12+ 25; 33 = 55 - Δ).* • *Understand and use the relationships between the four operations and the principles of the arithmetic laws; commutative, associative and distributive.* **(**Distributivity can be expressed as a(b+c) = ab + ac). • *Use rounding, estimation and inverse operations to check answers to calculations and determine, in the context of a problem, levels of accuracy.* • *Use a calculator to solve problems when the numbers involved are appropriate, including decimals and fractions, and interpret the display correctly for the context.*

• *Understand and use the relationships between the four operations and the principles of the arithmetic laws; commutative, associative and distributive.* **(**Distributivity can be expressed as a(b+c) = ab + ac). • *Use rounding, estimation and inverse operations to check answers to calculations and determine, in the context of a problem, levels of accuracy.* • **Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.** • **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.**	relationships, and place-value understanding. • *Use rounding, estimation and inverse operations to check answers to calculations and determine, in the context of a problem, levels of accuracy.*		

• Use multiplication and division as inverses e.g. by multiplying and dividing by powers of ten in scale drawings or by powers of 1000 in converting between units such as kilometres and meters. • *Solve calculation problems including using information from a range of tables and charts.* • *Apply understanding of number operations to solve number puzzles, routine and non –routine problems and explain reasoning.* • Use and explain the equals sign to indicate equivalence, including in missing number problems (e.g. 2 x 24 = 12 x 4; 33 = 5 x ◊). • **Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.** • Connect multiplication by a fraction to using fractions as operators (fractions of) and to division. This relates to			

scaling by simple fractions, including fractions • **Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.** • Use multiplication and division as inverses e.g. by multiplying and dividing by powers of ten in scale drawings or by powers of 1000 in converting between units such as kilometres and meters.			
Measurement	**Measurement 2 weeks**	**Measurement 2 weeks**	**Measurement 2 weeks**
• *Continue to use read and write standard metric units and their abbreviations, developing fluency in their relationships.* • *Suggest suitable units and equipment for measuring and read scales to an appropriate degree of accuracy.* • **convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)** using knowledge of place value and multiplication / division.	• **Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate** • **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 up to three decimal places** • **Recognise that shapes with the same areas can have different perimeters and vice versa**	• **Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate** • **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 up to three decimal places** • **Convert between miles and kilometres**	• **Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate** • **Convert between miles and kilometres** • Know approximate conversions and use to tell if an answer is sensible. • Connect conversion e.g. from kilometres to miles to a graphical representation as preparation for understanding linear /proportional graphs. • Begin to learn about compound units for speed, such

• **Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.** • **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 centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes.** *For rectangles use the formula, length* x *breadth = area, expressed in words or symbols.* • 5G–2 Compare areas and calculate the area of rectangles (including squares) using standard units. • **Estimate volume (e.g. using 1 cm³ blocks to build cubes and cuboids) and capacity (e.g. using water).** • Use the relations of perimeter or area to find unknown lengths, missing measures questions such as	• **Recognise when it is possible to use formulae for area and volume of shapes** • **Calculate the area of parallelograms and triangles.** Relate area of rectangles to parallelograms and triangles e.g. by dissection, calculate their areas, understanding and using the formulae (in words or symbols) to do this. • *Continue to read the time, interpret timetables and use units of time, including to* **solve problems involving converting between units of time.** • **Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.** *Information required to solve a problem is often drawn from tables, including timetables, graphs and charts.*	• Know approximate conversions and use to tell if an answer is sensible. • **Recognise that shapes with the same areas can have different perimeters and vice versa** • **Recognise when it is possible to use formulae for area and volume of shapes** • **Calculate the area of parallelograms and triangles.** Relate area of rectangles to parallelograms and triangles e.g. by dissection, calculate their areas, understanding and using the formulae (in words or symbols) to do this. • **Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].** • *Continue to read the time, interpret timetables and use units of time, including to* **solve problems involving converting between units of time.** • **Use all four operations to solve problems involving**	as miles per hour, if appropriate and apply their knowledge in science and other subjects. • **Calculate the area of parallelograms and triangles.** Relate area of rectangles to parallelograms and triangles e.g. by dissection, calculate their areas, understanding and using the formulae (in words or symbols) to do this. • **Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].** • Use a number line to add and subtract positive and negative integers for measures such as temperature • **Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.** *Information required to solve a problem is often drawn from tables, including timetables, graphs and charts.*

these can be expressed algebraically e.g. 4 + 2b = 20 for a rectangle of sides 2cm and bcm and perimeter 20cm. • Calculate area from scale drawings using given measurements**.** • **Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.** *Information required to solve a problem is often drawn from tables, including timetables, graphs and charts.* • *Apply measuring skills to an appropriate degree of accuracy, alongside the skills of thinking mathematically to solve problems. These should include practical problems and might involve construction of shapes or artefacts, often in a cross curricular context.* • *Make and explain connections between number, measures and shape.* • *Continue to read the time, interpret timetables and use units of time, including*		**measure (e.g. length, mass, volume, money) using decimal notation including scaling.** *Information required to solve a problem is often drawn from tables, including timetables, graphs and charts.*	

to **solve problems involving converting between units of time.**			
Geometry	**Geometry 2 weeks**	**Geometry 2 weeks**	**Geometry 2 weeks**
Properties of Shapes	**Properties of Shapes**	**Properties of Shapes**	**Properties of Shapes**
• *Continue to compare and classify geometric shapes based on developing knowledge and understanding of their properties.* • **Use the properties of rectangles to deduce related facts and find missing lengths and angles.** • **Identify 3D shapes, including cubes and other cuboids, from 2D representations.** • Become accurate in drawing lines with a ruler to the nearest millimetre, and measuring with a protractor. Use conventional markings for parallel lines and right angles. • *Solve problems, involving reasoning about shapes and their properties. Explain solutions orally or using writing, diagrams, practical materials or dynamic geometry ICT tools.*	• **Draw 2-D shapes** and nets accurately **using given dimensions and angles.** Use measuring tools and conventional markings and labels for lines and angles. • **Recognise, describe and build simple 3-D shapes, including making nets** • **Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.** • Express some relationships algebraically *e.g.* a = 180 – (b + c).	• **Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.** • Explain how unknown lengths and angles can be derived from known measurements. • **Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius** • **Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.** • **Draw 2-D shapes** and nets accurately **using given dimensions and angles.** Use measuring tools and conventional markings and labels for lines and angles.	• **Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.** • Explain how unknown lengths and angles can be derived from known measurements. • **Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius** • **Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.** • Express some relationships algebraically *e.g.* d = 2 x r, a = 180 – (b + c).

• **Distinguish between regular and irregular polygons based on reasoning about equal sides and 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°.**
• 5G–1 Compare angles, estimate and measure angles in degrees (°) and draw angles of a given size.
• Use the term diagonal and make conjectures about the angles formed between sides, and between diagonals and parallel sides, and other properties of quadrilaterals, e.g. through using dynamic geometry ICT tools.
		• **Recognise, describe and build simple 3-D shapes, including making nets**
		• 6G–1 Draw, compose, and decompose shapes according to given properties, including dimensions, angles and area, and solve related problems.	

Position and Direction	**Position and Direction**	**Position and Direction**	**Position and Direction**
• **Identify, describe and represent the position of a shape following a reflection, using the appropriate language, and know that the shape has not changed.** • Recognize and use reflection in a variety of diagrams, including continuing to use a 2D grid and coordinates in the first quadrant. Reflection should be in lines that are parallel to the axes. • *Recognize and use the eight compass directions* • *Solve problems, involving reasoning about shapes and their properties. Explain solutions orally or using writing, diagrams, practical materials or dynamic geometry ICT tools.*	• **Describe positions on the full coordinate grid (all four quadrants)** • Draw and label a pair of axes in all four quadrants with equal scaling, extending knowledge of one quadrant to all four quadrants, including the use of negative numbers. • Draw and label rectangles (including squares), specified by coordinates in the four quadrants, predicting missing coordinates, using the properties of the shapes. These might be expressed algebraically for example, translating vertex (a,b) to (a-2, b+3);(a,b) and (a+d, b+d) being opposite vertices of a square of side d.	• **Describe positions on the full coordinate grid (all four quadrants)** • Draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates, using the properties of the shapes. These might be expressed algebraically for example, translating vertex (a,b) to (a-2, b+3);(a,b) and (a+d, b+d) being opposite vertices of a square of side d. • **Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.** • *Recognize and use the eight compass directions*	• **Describe positions on the full coordinate grid (all four quadrants)** • Draw and label a pair of axes in all four quadrants with equal scaling, extending knowledge of one quadrant to all four quadrants, including the use of negative numbers. • Draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates, using the properties of the shapes. These might be expressed algebraically for example, translating vertex (a,b) to (a-2, b+3);(a,b) and (a+d, b+d) being opposite vertices of a square of side d.

			• **Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.**
Statistics	**Statistics 1 week**	**Statistics 1 week**	**Statistics 1 week**
Interpreting, Constructing and Presenting Data	**Interpreting, Constructing and Presenting Data**	**Interpreting, Constructing and Presenting Data**	**Interpreting, Constructing and Presenting Data**
• **Complete, read and interpret information in** (a wide range of charts and**) tables.** • Begin to decide which representations of data are most appropriate and why. • *Pose questions that can be answered using information presented in different graphs charts and tables.* • *Understand and use Venn and Carroll diagrams to support reasoning about numbers or shapes.* • *Apply the skills of collecting, representing and interpreting statistical data across the curriculum within and beyond mathematics, sometimes in response to an enquiry of interest to and suggested by pupils.* • **Solve comparison, sum and difference problems using information presented in a line graph.** • Connect work on coordinates and scales to their interpretation of time graphs.	• **Interpret and construct line graphs and use these to solve problems.** • **Calculate and interpret the mean as an average.** Know when it is appropriate to find the mean of a data set. • *Pose questions that can be answered using information presented in different graphs charts and tables.*	• **Interpret and construct pie charts and line graphs and use these to solve problems.** • Connect work on angles, fractions and percentages to the interpretation of pie charts. • Encounter and draw graphs relating to two variables, arising from their own enquiry and in other subjects • Connect conversion from kilometres to miles in measurement to its graphical representation. • **Calculate and interpret the mean as an average.** Know when it is appropriate to find the mean of a data set. • *Pose questions that can be answered using information presented in different graphs charts and tables.* • *Understand and use Venn and Carroll diagrams to support reasoning about numbers or shapes.*	• Encounter and draw graphs relating to two variables, arising from their own enquiry and in other subjects • Connect conversion from kilometres to miles in measurement to its graphical representation. • *Pose questions that can be answered using information presented in different graphs charts and tables.* • .