SMSG Maths

Progression

Contents

Number and Place Value

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum 2014 Objectives	• Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. • Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens. • Given a number, identify one more and one less. • Identify and represent numbers using objects and pictorial representations including the number line, and use the language of equal to, more than, less than (fewer), most, least. • Read and write numbers from 1 to 20 in numerals and words	• Count in steps of 2, 3 and 5 from 0, and in tens from any number, forward and backward. • Recognise the place value of each digit in a two-digit number (tens, ones) • Identify, represent and estimate numbers using different representations, including the number line. • Compare and order numbers from 0 up to 100; use <, > and = signs • Read and write numbers to at least 100 in numerals and in words. • Use place value and number facts to solve problems	• Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number. • recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • compare and order numbers up to 1000. • identify, represent and estimate numbers using different representations. • read and write numbers up to 1000 in numerals and in words. • solve number problems and practical problems involving these ideas	• count in multiples of 6, 7, 9, 25 and 1000. • find 1000 more or less than a given number. • count backwards through zero to include negative numbers. • recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) • order and compare numbers beyond 1000. • identify, represent and estimate numbers using different representations. • round any number to the nearest 10, 100 or 1000 • solve number and practical problems that involve all of the above and with increasingly large positive numbers. • read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value	• read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit. • count forwards or backwards in steps of powers of 10 for 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. • 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 all of the above • read Roman numerals to 1000 (M) and recognise years written in Roman numerals	• 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 • use negative numbers in context, and calculate intervals across zero. • solve number and practical problems that involve all of the above
White Rose Block and Sequence of lessons	Place Value (within 10): • sort objects • Count objects • Count objects from a larger group • Represent objects • Recognise numbers as words • Count on from any number • 1 more • Count backwards with 10 • 1 less • Compare groups by matching • Fewer, more, same • Less than, greater than, equal to • Compare numbers • Order objects and numbers	Place Value: • Represent numbers to 20 • Count objects to 100 by making 10s • Recognise tens and ones • Use a place value chart • Partition numbers to 100 • Write numbers to 100 in words • Flexibly partition numbers to 100 • Write numbers to 100 in expanded form • 10s on the number line to 100 • 10s and 1s on the number line to 100 • Estimate numbers on a number line	Place Value: • Represent numbers to 100 • Partition numbers to 100 • Number line to 100 • Hundred • Represent numbers to 1,000 • Partition numbers to 1,000 • Flexible partitioning of numbers to 1,000 • Hundreds, ten and ones • Find 1, 10 or 100 more or less • Number line to 1,000 • Estimate on a number line to 1,000 • Compare numbers to 1,000 • Order numbers to 1,000 • Count in 50s	Place Value: • Represent numbers to 1,000 • Partition numbers to 1,000 • Number line to 1,000 • Thousands • Represent numbers to 10,000 • Partition numbers to 10,000 • Flexible partitioning of numbers to 10,000 • Find 1, 10, 100, 1000 more or less • Number line to 10,000 • Compare number sto 10,000 • Order numbers to 10,000 • Roman numerals • Round to the nearest 10 • Round to the nearest 100	Place Value: • Roman numerals to 1,000 • Numbers to 10,000 • Numbers to 100,000 • Numbers to 1,000,000 • Powers of 10 • 10/100/1,000/10,000/100,000 more or less • Partition numbers to 1,000,000 • Number line to 1,000,000 • Compare and order numbers to 100,000 • Compare and order numbers to 1,000,000 • Round to the nearest 10, 100 or 1,000 • Round within 100,000 • Round with 1,000,000	Place Value: • Numbers to 1,000,000 • Numbers to 10,000,000 • Read and write numbers to 10,000,000 • Powers of 10 • Number line to 10,000,000 • Compare and order any integers • Round any integers • Negative numbers

	• The number line Place Value (within 20): • Place Value (within 50): •	• Compare objects • Compare numbers • Order objects and numbers • Count in 2s, 5s and 10s • Count in 3s		• Round to the nearest 1000 • Round to the nearest 10, 100 or 1,000	Negative Numbers: •	
Knowledge	• Equal means the same in amount, size or number. • More than means greater in amount or size. • Less than means smaller in amount or size. • Most means the biggest number or amount of something. • Least means the smallest number or amount of something	• Place value refers to the amount a digit is worth due to its position in a number. • Estimate means to have a sensible guess. • Estimating is calculating the approximate amount, size or value of something. • Less than (<) shows that the value to the left of it is lower than the value to the right of it. • Greater than (>) shows that the value to the left of it is higher than the value to the right of it. • Equals (=) shows that the number on each side of it has or should have the same value	• A digit is any number from 0 -9 • In place value, each place is 10 times the value of the place to its right	• A positive number is greater than zero. • A negative number is less than zero. • For two or more digits, if the number to the right of the place value number you are rounding is equal to or greater than 5, round up. • Estimate means to quickly find, with some thought of the calculation, an approximate value close to the right value. • Inverse operations are opposites that reverse the effect of the other operations. • In Roman numerals I = 1, V = 5, X = 10, L = 50 and C = 100. A; numbers between 1 and 100 can be written using a combination of these. • If a lower value numeral is placed after a higher value numeral, it indicates they should be added together. • If a lower value places before a higher value numeral it should be subtracted from the higher value	• Temperatures can be measured in Celsius. 0°C is the freezing point of water and 100°C is the boiling point of water. • For two or more digits, if the number to the right of the place value number you are round is equal to or greater than 5, round up. • If the number to the right of the place value number you are rounding is less than 5, round down. • In Roman numerals I = 1, V = 5, X = 10, L = 50, C = 100, D = 500 and M = 1000. All numbers between 1 and 1000 can be written using a combination of these. • If a lower value numeral is placed after a higher value numeral, it indicates they should be added together. • If a lower value places before a higher value numeral it should be subtracted from the higher value • Years are sometimes written in Roman numerals, for example 2020 is MMXX	• For two or more digits, if the number to the right of the place value number you are round is equal to or greater than 5, round up. • If the number to the right of the place value number you are rounding is less than 5, round down. • A positive number is greater than zero. • A negative number is less than zero. • When you adding or subtracting numbers that cross zero, the zero is counted • How negative numbers are used in various situations, e.g. temperature
Skills	• Make different number bonds for numbers up to 10. • Count to and across 100 (first 0 – 10, then to 20, then to 40 then to 100). • Count forwards, backwards, beginning with	• Count to 100 in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward. • Read and write numbers to 100 (in numerals and words), recognising the place value of each digit.	• Count in hundreds to 1000. • Count in fifties. • Count in fours and eights. • Recognise the value of a digit in a 3-digit number. • Compare and order numbers within 1000 and complete number patterns.	• Count to 10 000. • Count in thousands, hundreds, tens and ones. • Count in twenty - fives, sixes, sevens and nines. • Find 1000 more or less than a given number.	• Read and write numbers to 1 000 000. • Determine the place value of a digit in a number. • Compare and order numbers within 1 000 000. • Count forwards or backwards in steps of 1000, 10 000 and 100 000.	• Read and write numbers to 10 million. • Compare and order numbers within 10 million. • Tell the place value of a digit in a number. • Round numbers accurately to the nearest 10, 100,

	• 0 or 1 or from any given number. • Read and write numbers from 0 to 100 in numerals (first 0 – 10, then to 20, then to 40 then to 100). • Read and write numbers from 1 to 20 in numerals and words. • Compare and order numbers from 0 to 100 (first 0 – 10, then to 20, then to 40 then to 100). • Complete number patterns and make number stories. • Count in multiples of twos, fives and tens to 100. • Identify a number that is 1 more or 1 less than a 2-digit number. • Identify and represent numbers using objects and pictorial representations. • Use the language of equal to, more than, less than (fewer), most, least	• Compare and order numbers within 100 using the <, > and = signs. • Make and complete number patterns. • Identify, represent and estimate numbers using different representations.	• Find 10 or 100 more or less than a given number Identify, represent and estimate numbers using different representations. • Read and write numbers up to 1000 in numerals and in words. • Solve number problems and practical problems. • Recognise and read Roman Numerals to interpret the time.	• Recognise the place value of each digit in a four-digit number. • Compare and order numbers within 10 000. • Identify, represent and estimate numbers using different representations. • Describe and complete number patterns. • Round numbers to the nearest 10, 100 or 1000 • Estimate sum and difference using rounding. • Count backwards through zero to include negative numbers. • Read and write Roman numerals to 100 (I to C). • Know that over time, the numeral system changed to include the concept of zero and place value.	• Round numbers to the nearest 10, 100, 1000, 10000 and 100 000. • Solve number problems and practical problems. • Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero. • Write Roman numerals up to 1000 (M). • Recognise years written in Roman numerals.	1000, 10000, 100 000 and 1 000 000. • Solve number and practical problems involving place value. • Add and subtract negative numbers. • Use negative numbers in context. • Solve problems involving negative numbers. • Calculate intervals across zero
DfE and NCETM Ready To Progress Document	• 1NPV–1 Count within 100, forwards and backwards, starting with any number. • 1NPV–2 Reason about the location of numbers to 20 within the linear number system, including comparing using < > and = • 1NF–2 Count forwards and backwards in multiples of 2, 5 and 10, up to 10 multiples, beginning with any multiple, and count forwards and backwards through the odd numbers	• 2NPV–1 Recognise the place value of each digit in two-digit numbers, and compose and decompose two-digit numbers using standard and nonstandard partitioning. • 2NPV–2 Reason about the location of any two-digit number in the linear number system, including identifying the previous and next multiple of 10.	• 3NPV–1 Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three-digit multiples of 10. • 3NPV–2 Recognise the place value of each digit in three-digit numbers, and compose and decompose three-digit numbers using standard and non-standard partitioning. • 3NPV–3 Reason about the location of any three-digit number in the linear number system, including identifying the previous and next multiple of 100 and 10. • 3NPV–4 Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100	• 4NPV–1 Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100. • 4NPV–2 Recognise the place value of each digit in four-digit numbers, and compose and decompose four-digit numbers using standard and nonstandard partitioning. • 4NPV–3 Reason about the location of any four-digit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each. • 4NPV–4 Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number	• 5NPV–1 Know that 10 tenths are equivalent to 1 one, and 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. • 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	• 6NPV–1 Understand the relationship between powers of 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. • 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

with 2, 4, 5 and 10 equal parts. • 3NF–3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10).	lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts. • 4NF–3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100)	multiple of 1 and 0.1 and rounding to the nearest of each. • 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. • 5NPV–5 Convert between units of measure, including using common decimals and fractions. • 5NF–2 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth).	appropriate, including in contexts. • 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.

Addition and Subtraction

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum 2014 Objectives	• read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs • represent and use number bonds and related subtraction facts within 20. • add and subtract one-digit and two-digit numbers to 20, including zero. • solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 =☐ – 9.	• solve problems with addition and subtraction: • using concrete objects and pictorial representations, including those involving numbers, quantities and measures • applying their increasing knowledge of mental and written methods • recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100. • add and subtract numbers using concrete objects, pictorial representations, and mentally, including: • a two-digit number and ones • a two-digit number and tens • two two-digit numbers • adding three one-digit numbers • show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot. • recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	• add and subtract numbers mentally, including: • a three-digit number and ones • a three-digit number and tens • a three-digit number and hundreds • add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction. • estimate the answer to a calculation and use inverse operations to check answers. • solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	• add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. • estimate and use inverse operations to check answers to a calculation. • solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	• 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	• perform mental calculations, including with mixed operations and large numbers. • use their knowledge of the order of operations to carry out calculations involving the four operations. • 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
White Rose Block and Sequence of lessons	Addition and Subtraction (within 0): • Introduce parts and wholes • Part-whole model • Write number sentences • Fact families – addition facts • Number bonds within 10	Addition and Subtraction: • Bonds to 10 • Fact families – addition and subtraction bonds with 20 • Related facts • Bonds to 100 (tens) • Add and subtract 1s • Add by making 10 • Add three 1-digit numbers	Addition and Subtraction: • Apply number bonds within 10 • Add and subtract 1s • Add and subtract 10s • Add and subtract 100s • Spot the pattern • Add 1s across a 10 • Add 10s across a 100	Addition and Subtraction: • Add and subtract 1s, 10s, 100s and 1,000s • Add up to two 4-digit numbers – no renaming • Add two 4-digit numbers – one renaming • Add two 4-digit numbers – more than one renaming	Addition and Subtraction: • Mental strategies • Add whole numbers with more than four digits • Subtract whole numbers with more than four digits • Round to check answers • Inverse operations (addition and subtraction)	Addition, Subtraction, Multiplication and Division: • Add and subtract integers • Common factors • Common multiples • Solve multi-step problems • Order of operations • Mental calculations and estimation

	• Systematic number bonds with 10 • Number bonds to 10 • Addition – add together • Addition – add more • Addition problems • Find a part • Subtraction – find a part • Fact families – the eight facts • Subtraction – take away / cross out (How many left?) • Subtraction – take away (How many left?) • Subtraction on a number line • Add or subtract 1 or 2 Addition and Subtraction (within 20): •	• Add to the next 10 • Add across a 10 • Subtract across 10 • Subtract from a 10 • Subtract a 1-digit number from a 2-digit number (across a 10) • 10 more, 10 less • Add and subtract 10s • Add two 2-digit numbers (not across a 10) • Add two 2-digit numbers (across a 10) • Subtract two 2-digit numbers (not across a 10) • Subtract two 2-digit numbers (across a 10) • Mixed addition and subtraction • Compare number sentences • Missing number problems	• Subtract 1s across a 10 • Subtract 10s across a 100 • Make connections • Add two numbers (no renaming) • Subtract two numbers (no renaming) • Add two numbers (across a 10) • Add two numbers (across a 100) • Subtract two numbers (across a 10) • Subtract two numbers (across a 100) • Add 2-digit and 3-digit numbers • Subtract a 2-digit number from a 3-digit number • Complements to 100 • Estimate answers • Inverse operations • Make decisions	• Subtraction two 4 digit numbers – no renaming • Subtract two 4-digit numbers – 1 renaming • Subtract two 4-digit numbers more than 1 renaming • Efficient subtraction • Estimate answers • Checking strategies	• Multi-step addition and subtraction problems • Compare calculations • Find missing numbers	• Reason from known facts
Knowledge	• Addition (=) is putting two or more numbers or objects together to give a larger number (the total) • Subtraction (-) is removing or taking away numbers or objects. What is left is the difference between the two numbers. • The equals sign (=) shows that things on both sides of it have the same value • A number bond is a pair of numbers that add up to a given number. • 0, 1, 2,3, 4, 5, 6, 7, 8 and 9 are one-digit numbers. • One-digit numbers are made up of one digit or number. • Two-digit numbers have two digits, such as 12 or 20.	• Numbers cab be added in any order and the answer will be the same. • Numbers cannot be subtracted in any order to give the same answer	• Estimate means to quickly find, with some thought of the calculation, an approximate value close to the right value. • Inverse operations are opposites that reverse the effect of the other operation. • Addition and subtraction are inverse operations.	• Estimate means to quickly find, with some thought of the calculation, an approximate value close to the right value. • Inverse operations are opposites that reverse the effect of the other operation.	• Estimate means to quickly find, with some thought of the calculation, an approximate value close to the right value.	• Estimate means to quickly find, with some thought of the calculation, an approximate value close to the right value. • Use BODMAS (Brackets, Orders, Division, Multiplication, Addition, Subtraction) to solve word problems
Skills	• Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs • Represent and use number bonds and	• Solve problems (including a 2-digit number and ones, a two-digit number and tens and two two-digit numbers) with addition and subtraction (with and without	• Add and subtract numbers mentally (including a three-digit number and ones, a three-digit number and tens and a three-digit number and hundreds).	• Add and subtract 4-digit numbers without renaming using a formal written method. • Add and subtract 4-digit numbers with renaming	• Add whole numbers with more than 4 digits (using formal written methods). • Add numbers mentally with increasingly large numbers.	• Perform mental calculations (including mixed operations and larger numbers). • Use estimation to check answers to calculations and determine an

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	• related subtraction facts within 20. • Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems. • Use a range of methods for addition (add by counting, add by counting on, add by making 10 and add by adding ones) to add one digit and two-digit numbers to 20 including 0. • Use a range of methods for subtraction (subtract by crossing out, subtract using number bonds, subtract by counting back, subtract by subtracting ones and subtract by subtracting from 10) to subtract one digit and two-digit numbers to 20 including 0. • Make addition and subtraction stories. • Make a family of addition and subtraction facts.	renaming) using concrete objects and pictorial representations. • Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100. • Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot. • Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. • Apply an increasing knowledge of mental and written methods	• Add and subtract numbers without renaming using the formal written method. • Add and subtract numbers with renaming using the formal written method. • Solve word problems involving addition and subtraction. • Estimate the answer to a calculation and use inverse operations to check answers. • Solve problems, including missing number problems, using number facts and place value.	using a formal written method. • Add and subtract numbers mentally. • Solve word problems involving addition and subtraction. • Estimate and use inverse operations to check answers to a calculation. • Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	• Subtract whole numbers with more than 4 digits. • Subtract numbers mentally with increasingly large numbers. • Use rounding to check answers. • Solve word problems involving addition, subtraction, multiplication and division, and a combination of these, deciding on the most appropriate method and operation and knowing why.	appropriate degree of accuracy. • Use the order of operations to solve calculations involving the four operations. • Solve multi-step problems involving addition and subtraction, multiplication and division by selecting the most appropriate method, knowing why.
DfE and NCETM Ready To Progress Document	• 1NF–1 Develop fluency in addition and subtraction facts within 10. • 1AS–1 Compose numbers to 10 from 2 parts, and partition numbers to 10 into parts, including recognising odd and even numbers. • 1AS–2 Read, write and interpret equations containing addition (+), subtraction (-) and equals (=) symbols, and relate additive expressions and equations to real-life contexts.	• 2NF–1 Secure fluency in addition and subtraction facts within 10, through continued practice. • 2AS–1 Add and subtract across 10, for example: 8 + 5 = 13, 13 – 5 = 8 • 2AS–2 Recognise the subtraction structure of 'difference' and answer questions of the form, "How many more…?".. • 2AS–3 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only ones or only tens to/from a two-digit number.	• 3NF–1 Secure fluency in addition and subtraction facts that bridge 10, through continued practice. • 3AS–1 Calculate complements to 100. • 3AS–2 Add and subtract up to three-digit numbers using columnar methods. • 3AS–3 Manipulate the additive relationship: Understand the inverse relationship between addition and subtraction, and how both relate to the part–part–whole structure. Understand and use the commutative property of addition, and			• 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 relationships, and place-value understanding.

		• 2AS–4 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract any 2 two-digit numbers.	understand the related property for subtraction.		• 6AS/MD–3 Solve problems involving ratio relationships. • 6AS/MD–4 Solve problems with 2 unknowns.

Multiplication and Division

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum 2014 Objectives	• solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	• recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers. • calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	• recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. • write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods. • solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects	• recall multiplication and division facts for multiplication tables up to 12 × 12. • use place value, known and derived facts to multiply and divide mentally, including multiplying by 0 and 1; dividing by 1; multiplying together three numbers. • recognise and use factor pairs and commutativity in mental calculations. • multiply two-digit and three-digit numbers by a one-digit number using formal written layout. • solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.	• 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, prime factors and composite (nonprime) 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. • 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. • multiply and divide whole numbers and those involving decimals by 10, 100 and 1000. • recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}) • solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. • solve problems involving addition, subtraction,	• 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, 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 number using the formal written method of short division where appropriate, interpreting remainders according to the context. • identify common factors, common multiples and prime numbers. • perform mental calculations, including with mixed operations and large numbers. • 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

					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.	
White Rose Block and Sequence of lessons	Multiplication and Division: •	Multiplication and Division: •	Multiplication and Division A: • Multiplication – equal groups • Use arrays • Multiples of 2 • Multiples of 5 and 10 • Sharing and grouping • Multiply by 3 • Divide by 3 • The 3 times-table • Multiply by 4 • Divide by 4 • The 4 times-table • Multiply by 8 • Divide by 8 • The 8 times-table • The 2, 4 and 8 times-table Multiplication and Division B: •	Multiplication and Division A: • Multiples of 3 • Multiply and divide by 6 • 6 times-table and division facts • Multiply and divide by 9 • 9 times-table and division facts • The 3, 6 and 9 times-tables • Multiply and divide by 7 • 7 times-table and division facts • 11 times-table and division facts • 12 times-table and division facts • Multiply by 1 and 0 • Divide a number by 1 and itself • Multiply three numbers Multiplication and Division B: •	Multiplication and Division A: • Multiples • Common multiples • Factors • Common factors • Prime numbers • Square numbers • Cube numbers • Multiply by 10, 100 and 1,000 • Divide by 10, 1000 and 1,000 • Multiples of 10, 100 and 1,000 Multiplication and Division B: •	Addition, Subtraction, Multiplication and Division: • Common factors • Common multiples • Primes to 100 • Square and cube numbers • Multiply up to 4-digit number by a 2 digit number • Solve problems with multiplication • Short division • Division using factors • Introduction to long division • Long division with remainders • solve problems with division • Solve multi-step problems • Order of operations • Mental calculations and estimation • Reason from known facts
Knowledge	• Doubling is adding the same number to itself. • Halving is dividing or sharing a number into two equal parts or groups	• Multiplication (x) is repeated addition. • Division is splitting or sharing into equal parts. • An even number is any number ending in 0, 2, 4, 6 or 8. • An odd number is any number ending in 1, 3, 5, 7 or 9. • Numbers can be multiplied in any order and the answer will be the same. • Numbers cannot be divided in any order to give the same answer.	• Inverse operations are opposites that reverse the effect of the other operation. • Multiplication and division are inverse operations. • A positive number is greater than zero. • A negative number is less than zero. • An integer • Is a whole number that can be scaled up using repeated addition or multiplication • Correspondence in maths is how things are related.	• Inverse operations are opposites that reverse the effect of the other operation. • Multiplication and division are inverse operations. • Multiples are the values in that number's times table. For example, the multiples of 6 are 6, 12, 18 and so on • Multiplying by 2 is the same as doubling. • Multiplying by 4 is the same as doubling and doubling again.	• Factors are whole numbers that divide exactly into another number. The original numbers are factors of the product number. • Factor pairs are sets of two factors that when multiplied together give a particular number. • Common factors found in more than one number. • Prime numbers are whole umbers that are greater than 1 and can only divide by themselves and 1.	• Factors are whole numbers that divide exactly into another number. The original numbers are factors of the product number. • Factor pairs are sets of two factors that when multiplied together give a particular number. • Common factors found in more than one number. • Prime numbers are whole umbers that are greater than 1 and can only divide by themselves and 1.

		• Division is the opposite of multiplication. • Multiplication is the opposite of division.	There are different types of relationships: one to one, one to many, many to one and many to many	• Multiplying by 10 and halving is the same as multiplying by 5. • Factors are whole numbers that divide exactly into another number. The original numbers are factors of the product number. • Factor pairs are sets of two facts that when multiplied together give a particular number. • Partitioning breaks a number into its place value units. • The distributive law is that multiplying a number by a group of numbers added together is the same as doing each multiplication separately then adding them together. • The associative law is that it doesn't matter how numbers are grouped (calculated) when adding or multiplication. • Correspondence in maths is how things are related. There are different types of relationships: one to one, one to many, many to one and many to many	• Prime factors are prime numbers that can be multiplied together to give the original number. • Composite numbers are non-prime numbers (whole numbers that can be made by multiplying more than one pair of factors • Prime numbers are whole numbers that are greater than 1 and can only be divided by themselves and 1, 2, 3, 5, 7, 11, 13, 17 and 19 are prime numbers. • A square number is a number multiplied by itself. • A cube number is a number multiplied by itself three times. • A remainder is the whole number left over after a division calculation. • The notation for square numbers is (^{2}) and cub numbers is (^{3}) • Equals (=) shoes that things on both sides of it have or should have the same value	• Prime factors are prime numbers that can be multiplied together to give the original number. • Composite numbers are non-prime numbers (whole numbers that can be made by multiplying more than one pair of factors • Prime numbers are whole numbers that are greater than 1 and can only be divided by themselves and 1, 2, 3, 5, 7, 11, 13, 17 and 19 are prime numbers. • Estimate means to quickly find, with some thought of the calculation, an approximate value close to the right value. • Use BODMAS (Brackets, Orders, Division, Multiplication, Addition, Subtraction) to solve word problems
Skills	• Make equal groups. • Add equal groups to find the total number of objects. • Group things equally. • Share things equally. • Solve word problems about multiplication. • Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	• Apply an increasing knowledge of mental and written methods. • Recall and use the 2, 5 and 10 times table (both multiplication and division facts) • Recognise odd and even numbers. • Calculate and write multiplication equations for the times table facts using the X, ÷ and = signs. • Show that multiplication of two numbers can be done in any order (commutative) and	• Recall and use 3, 4 and 8 times table facts. • Divide a number by 3, 4 and 8. • Solve word problems involving the 3, 4 and 8 times tables. • Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.	• Multiply and divide by 6, 7, 9, 11 and 12 using multiplication table facts. • Multiply and divide with and without renaming. • Find the quotient and remainder in division. • Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers. • Recognise and use factor pairs and commutativity in mental calculations.	• Find multiples and common multiples. • Find factors (including all factor pairs) and common factors. • Identify prime numbers (up to 100), prime factors and composite numbers and be able to use the appropriate vocabulary. • Recognise square numbers and cube numbers, and use the notation for squares and cubes. • Multiply numbers up to 4 digits by a 1 or 2 digit number, using a formal	• Perform mental calculations (including mixed operations and larger numbers). • Use estimation to check answers to calculations and determine an appropriate degree of accuracy. • Use the order of operations to solve calculations involving the four operations. • Solve multi-step problems involving addition and subtraction, multiplication and division by selecting

		division of one number by another cannot. • Recall and write a family of multiplication and division facts. • Solve word problems involving multiplication and division, using pictorial and concrete resources	• Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	• Multiply two-digit and three-digit numbers by a one-digit number using formal written method. • Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects	written method (including long multiplication) • Multiply numbers up to 3 digits by a 2-digit number. • Multiply and divide mentally, drawing upon known facts. • Multiply and divide numbers by 10, 100 and 1000. • Divide 3-digit and 4-digit numbers 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})	the most appropriate method, knowing why. • Multiply numbers up to 4 digits by a 2-digit whole number using long multiplication. • Divide numbers up to 4 digits by a 2-digit whole number using an appropriate method. • Interpret remainders in division (either as whole number remainders, fractions, or by rounding, as appropriate) Identify common factors, common multiples and prime numbers.
DfE and NCETM Ready To Progress Document		• 2MD–1 Recognise repeated addition contexts, representing them with multiplication equations and calculating the product, within the 2, 5 and 10 multiplication tables. • 2MD–2 Relate grouping problems where the number of groups is unknown to multiplication equations with a missing factor, and to division equations (quotative division).	• 3NF–2 Recall multiplication facts, and corresponding division facts, in the 10, 5, 2, 4 and 8 multiplication tables, and recognise products in these multiplication tables as multiples of the corresponding number. • 3MD–1 Apply known multiplication and division facts to solve contextual problems with different structures, including quotative and partitive division.	• 4NF–1 Recall multiplication and division facts up to, and recognise products in multiplication tables as multiples of the corresponding number. • 4NF–2 Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders, and interpret remainders appropriately according to the context. • 4MD–1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size. • 4MD–2 Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication. • 4MD–3 Understand and apply the distributive property of multiplication.	• 5NF–1 Secure fluency in multiplication table facts, and corresponding division facts, through continued practice. • 5MD–1 Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size. • 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. • 5MD–3 Multiply any whole number with up to 4 digits by any one-digit number using a formal written method. • 5MD–4 Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders	• 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 relationships, and place-value understanding. • 6AS/MD–3 Solve problems involving ratio relationships. • 6AS/MD–4 Solve problems with 2 unknowns.

					appropriately for the context.	

Fraction (Including Decimals and Percentages)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum 2014 Objectives	• recognise, find and name a half as one of two equal parts of an object, shape or quantity. • recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.	• recognise, find, name and write fractions 1/3, ¼, 2/4 and ¾ of a length, shape, set of objects or quantity. • write simple fractions for example, ½ of 6 = 3 and recognise the equivalence of 2/4 and ½	• count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10. • recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators. • recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators. • recognise and show, using diagrams, equivalent fractions with small denominators. • add and subtract fractions with the same denominator within one whole [for example, 5/7 + 1/7 = 6/7) • compare and order unit fractions, and fractions with the same denominators. • solve problems that involve all of the above.	• recognise and show, using diagrams, families of common equivalent fractions. • count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. • solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number. • add and subtract fractions with the same denominator. • recognise and write decimal equivalents of any number of tenths or hundredths. • recognise and write decimal equivalents to ¼, ½ ¾. • find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths. • round decimals with one decimal place to the nearest whole number • compare numbers with the same number of decimal places up to two decimal places. • solve simple measure and money problems involving fractions and decimals to two decimal places.	• 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. • recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, 2/5 + 4/5 = 6/5 = 1 1/5] • add and subtract fractions with the same denominator and denominators that are multiples of the same number. • multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. • read and write decimal numbers as fractions [for example, 0.71 = 71/100] • recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. • round decimals with two decimal places to the nearest whole number and to one decimal place • read, write, order and compare numbers with up to three decimal places. • solve problems involving number up to three decimal places.	• use common factors to simplify fractions; use common multiples to express fractions in the same denomination. • compare and order fractions, including fractions > 1. • 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] • divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6] • associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8] • 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. • multiply one-digit numbers with up to two decimal places by whole numbers • 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. • recall and use equivalences between

					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. • solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25.	simple fractions, decimals and percentages, including in different contexts
White Rose Block and Sequence of lessons	Fractions: •	Fractions: •	Fractions A: • Fractions B: •	Fractions: • Decimals A: • Decimals B: •	Fractions A: • Find fractions equivalent to a unit fraction • Find fractions equivalent to a non-unit fraction • Recognise equivalent fractions • Convert improper fractions to mixed numbers • Convert mixed numbers to improper fractions • Compare fractions less than 1 • Order fractions less than 1 • Compare and order fractions greater than 1 • Add and subtract fractions with the same denominator • Add fractions within 1 • Add fractions with total greater than 1 • Add to a mixed number • Add two mixed numbers • Subtract fractions • Subtract from a mixed number • Subtract from a mixed number – breaking the whole • Subtract two mixed numbers Fractions B: • Decimals and Percentages:	Fractions A: • Equivalent fractions and simplifying • Equivalent fractions on a number line • Compare and order (denominator) • Compare and order (numerator) • Add and subtract simple fractions • Add and subtract any two fractions • Add mixed numbers • Subtract mixed numbers • Multi-step problems Fractions B: • Multiply fractions by integers • Multiply fractions by fractions • Divide fractions by an integer • Divide any fraction by an integer • Mixed questions with fractions • Fraction of an amount • Fraction of an amount – find the whole Fractions, Decimals and Percentages: •

					• Decimals: •	
Knowledge	• A half is one of two equal parts of a whole object, shape or quantity. • A quarter is one of four equal parts of a whole object, shape or quantity.	• A half is one of two equal parts of a whole object, shape or quantity. • A quarter is one of four equal parts of a whole object, shape or quantity. • A third is one of three equal parts of a whole object, shape or quantity. • Equivalence means of equal (the same) value. • Two quarters are equivalent to one half.	• A tenth is 1 divided by 10. • Unit fractions have a numerator of 1. • Non-unit fractions have a numerator greater than 1. • The numerator of a fraction is the top number and shows how many parts there are. • The denominator of a fraction is the bottom number and shows into how many equal parts the item or number is divided. • Unit fractions have a numerator of 1. • Non-unit fractions have a numerator greater than 1. • Equivalence means of equal (the same) value.	• A tenth is 1 divided by 10. • A hundredth is 1 divided by 100. • The numerator of a fraction is the top number and shows how many parts there are. • The denominator of a fraction is the bottom number and shows into how many equal parts the item or number is divided. • A fraction where the numerator is greater than the denominator is an improper fraction and has a value greater than one. • A decimal number is a number with a decimal point in it that shows the whole number to the left of the point and tenths, hundredths and thousandths and so on to the right of it. • Fractions have decimal equivalents. • For two or more digit numbers, if the number to the right of the place value number you are rounding is equal to or greater than 5, round up. • If the number to the right of the place value number you are rounding is less than 5, round down. • In place value, each place is 10 times the value of the place to its right, including after the decimal point	• The numerator of a fraction is the top number and shows how many parts there are. • The denominator of a fraction is the bottom number and shows into how many equal parts the item or number is divided. • Unit fractions have a numerator of 1. • Non-unit fractions have a numerator greater than 1. • Equivalence means of equal (the same) value. • A tenth is 1 divided by 10. • A hundredth is 1 divided by 100. • A thousandth is 1 divided by 1000. • A proper fraction has a numerator less than the denominator. • An improper fraction has a numerator equal to or greater than the denominator. • A mixed number is the combination of a whole number and a proper fraction. • For two or more digit numbers, if the number to the right of the place value number you are rounding is equal to or greater than 5, round up. • If the number to the right of the place value number you are rounding is less than 5, round down. • In place value, each place is 10 times the value of the place to its right, including after the decimal point.	• Factors are whole numbers that divide exactly into another number. The original numbers are factors of the product number. • Factor pairs are sets of two factors that when multiplied together give a particular number. • Common factors found in more than one number. • The numerator of a fraction is the top number and shows how many parts there are. • The denominator of a fraction is the bottom number and shows into how many equal parts the item or number is divided. • Unit fractions have a numerator of 1. • Non-unit fractions have a numerator greater than 1. • Equivalence means of equal (the same) value.

Skills					% is the symbol for percent and percent is the number of parts per hundred.	
Skills	• Recognise, find, show and name a half (knowing it is one of two equal parts). • Recognise, find, show and name a quarter (knowing it is one of four equal parts). • Group/share objects, shapes and quantities to get a half or a quarter.	• Recognise, find, name and write fractions (1/3, ¼, 2/4, and ¾) of a length, shape, set of objects or quantity. • Name and write a simple fraction. • Name fractions that make one whole. • Compare and order fractions. • Count wholes with halves, quarters and thirds. • Find part of a set and a quantity (e.g. ½ of 6 = 3). • Recognise the equivalent of ½ and 2/4.	• Count up and down in tenths. • Recognise, find and write fractions of a discrete set of objects (unit and non-unit fractions) • Recognise and use fractions as numbers. • Recognise and show, using diagrams, equivalent fractions with small denominators. • Add and subtract fractions with the same denominator within one whole. • Compare and order unit fractions, and fractions with the same denominators	• Count up and down hundredths. • Write and show mixed numbers on a number line. • Recognise and show equivalent fractions families (using diagrams). • Add and subtract fractions with the same denominator. • Solve word problems involving fractions to calculate quantities and fractions to divide quantities including where the answer is a whole number. • Recognise and write tenths and their decimal equivalents. • Recognise and write hundredths and their decimal equivalents. • Compare numbers with the same number of decimal places (up to 2dp). • Complete number patterns involving decimals. • Round decimals with one decimal place to the nearest whole number. • Recognise and write decimal equivalents of ¼, ½ and ¾. • Divide a 1 or 2 digit number by 10 and by 100. • Solve simple measure and money problems involving decimals.	• Find, name and write equivalent fractions of a given fraction (including tenths and hundredths). • Recognise mixed numbers and improper fractions and convert from one form to the other. • Use these to write mathematical statements. • Compare and order fractions whose denominators are all multiples of the same number • Add and subtract fractions with the same denominator and denominators that are multiples of the same number. • Multiply proper fractions and mixed numbers by whole numbers. • Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. • Read and write decimals up to three decimal places. • Compare and order decimals up to three decimal places. • Read and write fractions as decimals. • Add and subtract decimals. • Round decimals with two decimal places to the nearest whole number and to one decimal place. • Solve problems involving decimals up to three decimal places. • Recognise the per cent symbol (%).	• Find equivalent fractions using common multiples. • Simplify fractions using common factors. • Compare and order fractions (including fractions >1) • Add and subtract fractions with different denominators and mixed numbers. • Multiply proper fractions (giving the answer in its simplest form). • Divide proper fractions by whole numbers. • Relate division of whole numbers to fractions and decimals. • Relate division of whole numbers to fractions and decimals. • Write and calculate fractions as decimals. • Tell the place value of digits in a decimal number (up to three decimal places). • Multiply and divide decimals with 1 -digit and 2 -digit whole numbers. • Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places. • 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. • Calculate the percentage of a number and a quantity. • Use percentage to describe changes.

					• Understand that percent related to 'number of parts per hundred'. • Find percentages of a given number. • Interpret a percentage as a fraction of an amount (with denominator 100) and as a decimal. • Solve problems which require knowing percentage and decimal equivalents (e.g., ¼, 1/5, ½) and fractions with a denominator of a multiple of 10 or 25.	• Use percentage to compare amounts. • Solve problems involving the calculation of percentages and the use of percentages for comparison
DfE and NCETM Ready To Progress Document			• 3F–1 Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts. • 3F–2 Find unit fractions of quantities using known division facts (multiplication tables fluency). • 3F–3 Reason about the location of any fraction within 1 in the linear number system. • 3F–4 Add and subtract fractions with the same denominator, within 1.	• 4F–1 Reason about the location of mixed numbers in the linear number system. • 4F–2 Convert mixed numbers to improper fractions and vice versa. • 4F–3 Add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers.	• 5F–1 Find non-unit fractions of quantities. • 5F–2 Find equivalent fractions and understand that they have the same value and the same position in the linear number system. • 5F–3 Recall decimal fraction equivalents for ½, ¼, 1/5 and 1/10 and for multiples of these proper fractions.	• 6F–1 Recognise when fractions can be simplified, and use common factors to simplify fractions. • 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.

Geometry (Properties of Shape)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum 2014 Objectives	• compare, describe and solve practical problems for: • lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] • mass/weight [for example, heavy/light, heavier than, lighter than] • capacity and volume [for example, full/empty, more than, less than, half, half full, quarter] • time [for example, quicker, slower, earlier, later] • measure and begin to record the following: • lengths and heights • mass/weight • capacity and volume • time (hours, minutes, seconds) • recognise and know the value of different denominations of coins and notes. • sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening] • recognise and use language relating to dates, including days of the week, weeks, months and years. • tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.	• choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels. • compare and order lengths, mass, volume/capacity and record the results using >, < and = • recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value. • find different combinations of coins that equal the same amounts of money. • solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change. • compare and sequence intervals of time. • tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times. • know the number of minutes in an hour and the number of hours in a day.	• draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them. • recognise angles as a property of shape or a description of a turn. • identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle. • identify horizontal and vertical lines and pairs of perpendicular and parallel lines.	• compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes. • identify acute and obtuse angles and compare and order angles up to two right angles by size. • identify lines of symmetry in 2-D shapes presented in different orientations. • complete a simple symmetric figure with respect to a specific line of symmetry.	• identify 3-D shapes, including cubes and other cuboids, from 2-D representations. • 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 the properties of rectangles to deduce related facts and find missing lengths and angles. • distinguish between regular and irregular polygons based on reasoning about equal sides and angles	• draw 2-D shapes using given dimensions 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. • 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.
White Rose Block and	Shape: • Recognise and name 3-D shapes	Shape: • Recognise 2-D and 3-D shapes	Shape: •	Shape: •	Shape: •	Shape: •

Sequence of lessons	• Sort 3-D shapes • Recognise and name 2-D shapes • Sort 2-D shapes • Patterns with 2-D and 3-D shapes	• Count sides on 2-D shapes • Count vertices on 2-D shapes • Draw 2-D shapes • Lines of symmetry on shapes • Use lines of symmetry to complete shapes • Sort 2-D shapes • Count faces on 3-D shapes • Count edges on 3-D shapes • Count vertices on 3-D shapes • Sort 3-D shapes • Make patterns with 2-D and 3-D shapes				
Knowledge	• These are common 2-D shapes: squares, rectangles, circles, triangles, pentagons, hexagons and octagons. • Common 3-D shapes include cuboids, cubes, spheres, cones, cylinders and pyramids.	• A two-dimensional (2-D) shape only has two measurements. • These are common 2-D shapes: squares, rectangles, circles, triangles, pentagons, hexagons and octagons. • A shape has symmetry in a vertical line if a line can be drawn down the middle of it and the left side is a mirror image of the right. • Squares and rectangles have four sides and a vertical line of symmetry. • Circles have one side and a vertical line of symmetry. • Triangles have three sides and may have a vertical line of symmetry. • A vertex of a 3-D shape is a corner where lines meet. • The plural of vertex is vertices. • An edge of a 3-D shape joins two vertices. • The flat surface of a 3-D shape is called a face. • A three-dimensional (3-D) shape has three measurements and can be held.	• A two-dimensional shape only has two measurements. • A three-dimensional shape has three measurements and can be held. • Common 3-D shapes include cuboids, cubes, spheres, cones, cylinders and pyramids. • A vertex of a 3-D shape is a corner where lines meet. • The plural of vertex is vertices. • An edge of a 3-D shape joins two vertices. • The flat surface of a 3-D shape is called a face. • An angle is the amount of turn, or space, between two lines around their vertex and is measured in degrees. • A right angle is a quarter-turn. • Two right angles make a half turn. • Three right angles make three-quarters of a turn. • Four right angles make a complete turn. • Horizontal lines go across.	• A quadrilateral is a four-sided shaped (quad is derived from the Latin word meaning four and lateral is related to sides). • A square has four equal sides, four right angles and four lines of symmetry. • A rectangle or oblong has two sets of two equal sides, four right angles and four lines of symmetry. • A parallelogram has two sets of two equal sides, two sets of two equal angles and usually no lines of symmetry. • A trapezium has at least two parallel sides and can have pairs of equal angles and a line of symmetry. • A triangle is a three-sided shape (tri is derived from Latin and Greek meaning three). • An equilateral triangle has three equal sides and angles and three lines of symmetry. • An isosceles triangle has two equal sides and angles.	• An angle is the amount of turn, or space, between two lines around their vertex and is measured in degrees. • An acute angle is less than a right angle (90º). • An obtuse angle is greater than a right angle (90º) but less than a straight angle (180º). • A reflex angle is greater than a straight angle (180º) but less than 360º (a complete rotation). • A polygon (a 2-D shape formed with straight lines) is regular when all sides and angles are equal. • A polygon is irregular if it has different length sides and/or angles.	• Angles on one side of a straight line add up to 180∘ • The three interior angles of a triangle always add to 180° • Angles around a point will always add up to 360 degrees • Radius is distance from the centre to the circumference of a circle. • Radius is half of the circle's diameter. • Diameter is distance from one point on a circle through the centre to another point on the circle. • Diameter is also the longest distance across the circle. • Diameter is twice the radius. • Circumference is the distance around the edge of a circle (or any curvy shape). • Circumference is a type of perimeter.

		• Common 3-D shapes include cuboids, cubes, spheres, cones, cylinders and pyramids. • The flat surface of a 3-D shape is called a face. • The faces of a cuboid can be rectangles and squares. • The faces on a cube are squares. • Two of the faces on a cylinder are circles. • One of the faces on a pyramid may be a circle, square or a rectangle.	• Vertical lines go up and down. • Perpendicular lines are lines that form a right angle where they meet or cross. • Parallel lines never meet or cross. They are always the same distance apart	• A scalene triangle has no equal sides and no equal angles. • A right-angled triangle has a 90º. • The angles in any triangle add up to 180º. • An acute angle is less than a right angle (90º). • An obtuse angle is greater than a right angle (90º) but less than a straight angle (180º). • A shape or object is symmetrical if you can draw a straight line vertically, horizontally or diagonally down the middle of it and the two sides are a mirror image of each other. • The straight, often imaginary, lines are called lines or axes of symmetry.		
Skills	• Recognise and name common 2-D and 3-D shapes • Look for shapes in solids. • Group shapes. • Make and complete patterns with shapes.	• Identify and describe the properties of 2-D shapes, including the number of sides, vertices and line symmetry in a vertical line. • Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces. • Identify 2-D shapes on the surface of 3-D shapes. • Compare, group and sort common 2-D and 3-D shapes and everyday objects. • Form different figures with shapes and make patterns. • Draw figures on a square grid and a dot grid. • Move and turn shapes. • Recognise flat faces and curved surfaces. • Fold two-dimensional shapes into three-dimensional ones.	• Draw 2-D shapes and make 3-D shapes using modelling materials. • Recognise 3-D shapes in different orientations and describe them. • Recognise an angle as a property of a shape or description of a turn. • Find angles in shapes. • Find a right angle, an acute angle and an obtuse angle. • Compare the sizes of angles, identifying where they are greater than or less than a right angle. • Make a half turn, a three-quarters turn and a full turn and relate this to the number or right angles. • Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.	• Identify acute and obtuse angles. • Compare and order angles up to two right angles by size. • Compare and classify triangles and quadrilaterals based on their properties and sizes. • Identify lines of symmetry in 2-D shapes presented in different orientations. • Complete a simple symmetrical figure with respect to a specific line of symmetry.	• Identify, estimate and compare acute angles, right angles, obtuse angles and reflex angles. • Draw and measure given angles. • Identify angles on a whole turn, a straight line and angles that meet at a point. • Find unknown lengths and angles in squares and rectangles, using their properties. • Identify regular and irregular polygons, based on reasoning. • Identify 3-D shapes from 2-D representations.	• Recognise angles that meet at a point, angles on a straight line, and vertically opposite angles. • Find unknown angles in triangles, quadrilaterals and regular polygons. • Compare and classify geometric shapes based on their properties and sizes. • Identify the radius, diameter, circumference and centre of a circle. • Draw 2-D shapes using given dimensions and angles. • Identify, describe and build 3D shapes (including nets).
DfE and NCETM	• 1G–1 Recognise common 2D and 3D shapes	• 2G–1 Use precise language to describe the	• 3G–1 Recognise right angles as a property of	• 4G–1 Draw polygons, specified by coordinates	• 5G–2 Compare areas and calculate the area of	• 6G–1 Draw, compose, and decompose shapes

| **Ready To Progress Document** | presented in different orientations, and know that rectangles, triangles, cuboids and pyramids are not always similar to one another.
• 1G–2 Compose 2D and 3D shapes from smaller shapes to match an example, including manipulating shapes to place them in particular orientations. | properties of 2D and 3D shapes, and compare shapes by reasoning about similarities and differences In properties. | shape or a description of a turn, and identify right angles in 2D shapes presented in different orientations.
• 3G–2 Draw polygons by joining marked points, and identify parallel and perpendicular sides. | in the first quadrant, and translate within the first quadrant.
• 4G–2 Identify regular polygons, including equilateral triangles and squares, as those in which the side-lengths are equal and the angles are equal. Find the perimeter of regular and irregular polygons.
• 4G–3 Identify line symmetry in 2D shapes presented in different orientations. Reflect shapes in a line of symmetry and complete a symmetric figure or pattern with respect to a specified line of symmetry. | rectangles (including squares) using standard units. | according to given properties, including dimensions, angles and area, and solve related problems. |

Geometry (Position and Direction)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum 2014 Objectives	• recognise and name common 2-D and 3-D shapes, including: • 2-D shapes [for example, rectangles (including squares), circles and triangles] • 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].	• identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. • identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces. • identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] • compare and sort common 2-D and 3-D shapes and everyday objects.		• describe positions on a 2-D grid as coordinates in the first quadrant. • describe movements between positions as translations of a given unit to the left/right and up/down. • plot specified points and draw sides to complete a given polygon.	• 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	• 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.
White Rose Block and Sequence of lessons	Position and direction: •	Position and Direction: •		Position and Direction: •	Position and Direction: •	Position and Direction: •
Knowledge	• Position, direction and movement can be described using these words: top, middle, bottom, on top of, in front of, above, between, around, near, close, far, up, down, turn, forwards, backwards, inside, outside, left and right.	• Position, directly and movement, including rotation, can be described using these words: top, middle, bottom, on top of, in front of, above, between, around, near, close, far, up, down, turn, forwards, backwards, inside, outside, left and right. • A half is one of two equal parts of a whole object, shape, quantity or movement. • A quarter is one of four equal parts of a whole object, shape, quantity or movement. • Clockwise is the movement in the direction of the rotation of the hands of a clock. • The opposite direction is anticlockwise.		• Coordinates are numbers or letters that determine the position of a point or shape in a grid, graph or map. • The x-axis is horizontal from or through zero and the y-axis is vertical from or through zero. • When reading coordinates or using them to determine a point, x is read before y. • A translation moves a shape up, down or from side to side, without reflecting it or changing its shape. • A polygon is any 2-D shape formed with straight lines.	• A translation moves a shape up, down or from side to side, without reflecting it or changing its shape. • A reflection is the image of a shape if it was looked at in a mirror. • Shapes that have been translated or reflected are the same size as the original shape.	• Coordinates are numbers or letters that determine the position of a point or shape in a grid, graph or map. • The x-axis is horizontal from or through zero and the y-axis is vertical from or through zero. • When reading coordinates or using them to determine a point, x is read before y. • A translation moves a shape up, down or from side to side, without reflecting it or changing its shape. • A reflection is the image of a shape if it was looked at in a mirror. • Shapes that have been translated or reflected are the same size as the original shape.

Skills	• Name positions in a race and in a queue, using appropriate language. • Describe movements and turns (including half, whole, quarter and three quarters)	• Order and arrange combinations of mathematical objects in patterns and sequences. • Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise).		• Describe positions using coordinates (using the first quadrant). • Plot points and draw sides to complete a given polygon. • Describe movement between positions as translations using up/down and left right	• Write the coordinates of points. • Identify, describe translations and reflections. • Represent the position of a shape after translation or after reflection. • To understand the shape has not changed during translation or reflection.	• Use coordinate grids with negative numbers. • Describe positions of points with coordinates (on a full coordinate grid). • Draw, translate and reflect simple shapes on the coordinate plane.
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Measurement

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum 2014 Objectives	• describe position, direction and movement, including whole, half, quarter and three-quarter turns	• order and arrange combinations of mathematical objects in patterns and sequences. • use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise)	• measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) • measure the perimeter of simple 2-D shapes. • add and subtract amounts of money to give change, using both £ and p in practical contexts. • tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks. • estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight. • know the number of seconds in a minute and the number of days in each month, year and leap year. • compare durations of events [for example to calculate the time taken by particular events or tasks].	• Convert between different units of measure [for example, kilometre to metre; hour to minute] • measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres. • find the area of rectilinear shapes by counting squares. • estimate, compare and calculate different measures, including money in pounds and pence. • read, write and convert time between analogue and digital 12- and 24-hour clocks. • solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	• convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • 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 rectangles (including squares), and including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes. • estimate volume [for example, using 1 cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water] • solve problems involving converting between units of time. • use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.	• 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. • 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. • 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]
White Rose Block and Sequence of lessons	Length and Height: • Mass and volume: • Money:	Money: • Length and height: •	Length and Perimeter: • Mass and Capacity: • Money:	Area: • What is area? • Count squares • Makes shapes • Compare areas Length and Perimeter:	Perimeter and Area: • Converting Units: • Volume:	Converting Units: • Metric measures • Convert metric measures • Calculate with metric measures • Miles and kilometres • Imperial measure

	• Time: •	Mass, capacity and temperature: • Time: •	• Time: •	• Money: • Time: •	•	Area, Perimeter and Volume: •
Knowledge	• Length is a measure of how long something is from end to end. • Height is a measure of how high something is from head to foot or top to base. • Mass or weight is the measure of the amount of something and how heavy it is. • Capacity is how much a container can hold. • Volume is the space that water takes up in a container. • Time can be described using these words: quicker, slower, earlier and later. • Length is a measure of how long something is from end to end. • Height is a measure of how high something is from head to foot or top to base. • Mass or weight is the measure of the amount of something and how heavy it is. • Capacity is how much a container can hold. • Volume is the space that water takes up in a container. • Time can be measured using hours, minutes and seconds. • Events can be sequenced using these words: before, after, now, next, first, today, yesterday, tomorrow, morning,	• Estimate means to have a sensible guess. Estimating is calculating the approximate amount, size or value of something. • A scale is a set of numbers on measuring equipment that is used to show the value or size of something. • Length, width and height can be measured in metres or centimetres. • There are 100cm in 1m. • Mass can be measured in kilograms or grams. • There are 1000g in 1kg. • Temperatures can be measured in degrees Celsius. • 0ºC is the freezing point of water and 100ºC is the boiling point of water. • Capacity can be measured in litres or millilitres. • There are 1000ml in 1L. • Length is a measure of how long something is from end to end. • Height is a measure of how high something is from head to foot or top to base. • Mass or weight is the measure of the amount of something and how heavy it is. • Capacity is how much a container can hold. • Volume is the measure of the space something takes up. • Equals shows that things on both sides of it have or	• Length, width and height can be measured in metres and centimetres. • There are 100cm in 1m. • Mass can be measured in kilograms or grams. • There are 1000g in 1kg. • Temperatures can be measured in Celsius. • 0ºC is the freezing point of water and 100ºC is the boiling point of water. • Capacity can be measured in litres and millilitres. • There are 1000ml in 1l. • The perimeter is the total distance around the edge of a shape. • Money can be measured in pounds and pence. • There are 100p in £1. • In Roman numerals I=1, II=2, III=3, IV=4, V=5, VI=6, VII=7, VIII=8, IX=9, X=10, XI=11 and XII=12. • O'clock is used after a number from 1 to 12 to give the time when it is exactly that hour. • A time is in the morning if it is followed by 'am' and in the afternoon if it is followed by 'pm'. • Noon is 12pm and midnight is 12am. • There are 60 seconds in a minute, 60 minutes in an hour and 24 hours in a day. • There are 365 days in a year and 366 in a leap year which occurs every fourth year.	• There are 100cm in 1m. • There are 1000m in 1km. • There are 1000g in 1kg. • There are 1000ml in 1l. • Kilo is derived from a Greek word meaning thousand. • Perimeter is the total distance around the edge of a shape. • Area is the amount of space inside the boundary of a 2-D object or face of a 3-D object. • There are 60 minutes in an hour and 60 seconds in a minute. • There are 7 days in a week, between 28 and 31 days in a month, 365 days in a year and 366 in a leap year, which occurs every fourth year.	• There are 10mm in 1cm, 100cm in 1m and 1000m in 1km. • There are 1000g in 1kg. • There are 1000ml in 1l. • Kilo is derived from a Greek word meaning thousand. • Imperial units of measurement were used in Britain from the 1820's to the 1960's when the metric system, using multiples of 10, was adopted. • 1 inch = 2.5 cm. • 1 foot = 12 inches = 30cm (approximately). • 1 yard = 3 feet = 914cm (approximately 1m). • 1 mile = 1760 yards = 1.6km. • 1 ounce = 28g. • 1 pound = 16 ounces = 453g (approximately ½ kg). • 1 stone = 14 pounds = 6.4kg. • 1 pint =568ml (approximately ½ l). • 1 gallon = 8 pints = 4.5l. • Perimeter is the total distance around the edge of a shape. • A composite shape is made of two or more rectilinear figures (polygons with interior angles of 90º or 270º, including squares). • The area of a rectangle (including squares) is calculated by multiplying its height by its width.	• Imperial units of measurement were used in Britain from the 1820's to the 1960's when the metric system, using multiples of 10, was adopted. • 1 inch = 2.5 cm. • 1 foot = 12 inches = 30cm (approximately). • 1 yard = 3 feet = 914cm (approximately 1m). • 1 mile = 1760 yards = 1.6km. • 1 ounce = 28g. • 1 pound = 16 ounces = 453g (approximately ½ kg). • 1 stone = 14 pounds = 6.4kg. • 1 pint =568ml (approximately ½ l). • 1 gallon = 8 pints = 4.5l. • Area = width × height • Volume = length × width × height

	afternoon, evening, earlier and later. • The past refers to events that have already happened. • The present refers to events that are happening now. • The future refers to events that haven't happened yet. • There are seven days in a week: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday and Sunday. • There are twelve months in a year: January, February, March, April, May, June, July, August, September, October, November and December. • There are four seasons in a year: Spring, Summer, Autumn and Winter. • The hour hand is the shorter hand on a clock and the minute hand is the longer hand. • On an analogue clock, the minute hand points to 12 when it is an o'clock time and points to 6 when it is half past the hour.	should have the same value. • Less than shows that the value to the left of it is lower than the value to the right of it. • Greater than shows that the value to the left of it is higher than the value to the right of it. • Money can be measured in pounds and pence. • There are 100p in £1. • Change is the money returned to someone when they have paid for an item with an amount that is greater than the price. • An analogue clock face can be divided into 60 minutes. It often shows 5 minute intervals using the numbers from 1 to 12 on the face. • The hour hand is the shorter hand on a clock and the minute hand is the longer hand on a clock. • Clockwise is the movement round a clock from left to right and hands move in a clockwise direction. • On an analogue clock, the minute hand points to 12 when it is an o'clock time and points to 6 when it is half past the hour. • The minute hand points towards the 3 at quarter past and 9 at quarter to the hour. • There are 60 seconds in a minute, 60 minutes in an hour and 24 hours in a day.	• The months of the year are January (31 days), February (28 or 29 days), March (31 days), April (30 days), May (31 days), June (30 days), July (31 days), August (31 days), September (30 days), October (31 days), November (30 days) and December (31 days). • Duration is the length of time something lasts		• Standard units of area are square centimetres or centimetres squared (cm²) and square metres or metres squared (m²). • Capacity is a measure of how much something can hold. • Volume is the measure of the space that an object or liquid takes up. • There are 60 minutes in an hour and 60 seconds in a minute. • There are 7 days in a week, between 28 and 31 days in a month, 365 days in a year and 366 in a leap year, which occurs every fourth year.	
Skills	• Measure and record lengths and heights (in metres and centimetres).	• Choose and use appropriate standard units to estimate and measure length/height to the	• Measure, compare, add and subtract different lengths and masses.	• Measure and estimate length. • Convert between different units of length and mass.	• Convert between measurements of metric measure.	• Solve problems involving the calculation and conversion of units of measure, using decimal

• Compare, order and describe different lengths using appropriate language. • Know when to use cm or m to measure length. • How to measure and draw lines. • Measure and record mass and weight of different objects. • Compare, order and describe different masses and weights using the appropriate language. • Compare and describe volume and capacity. • Use half and a quarter to describe volume. • Measure and record volume and capacity • Tell the time to the hour and half past the hour. • Draw the hands on a clock face to show these times. • Measure and record time (hours, minutes and seconds) • Sequence events in chronological order using appropriate language. • Compare, order and describe time using the appropriate language. • Recognise and use language relating to dates, including days of the week, weeks, months and years. • Recognise and know the value of different denominations of coins and notes	nearest appropriate unit (m/cm). • Compare and order lengths, using <, > ad = to record the results • Choose and use appropriate standard units to estimate and measure to the nearest appropriate unit (Kg/g). • Compare and order mass, using <, > ad = to record the results • Know when to use cm or m to measure length and Kg or g to measure mass. • Measure and draw lines to a given length. • Solve word problems on length and mass. • Choose and use appropriate standard units to estimate and measure capacity to the nearest appropriate unit (ml/L). • Compare and order volume / capacity, using <, > ad = to record the results • Solve word problems on volume. • Tell and write the time to 5 minutes, including quarter past/to the hour. • Draw hands on a clock face to show time. • Find the duration of time. • Find the ending or starting time. • Compare and sequence intervals of time. • Know the number of minutes in an hour. • Know the number of hours in a day. • Name coins and notes. • Recognise and use symbols for pounds (£) and pence (p). • Count an amount of money.	• Write length in kilometres (km), metres (m) and centimetres (cm). • Convert length from m and cm to cm, cm to m and cm, km and m to m and m to km and m. • Write length in kilometres (km) and metres (m). • Read the scales for mass in kilograms (kg) and grams (g). • Solve word problems on length and mass. • Measure the total length around a shape. • Find the perimeter of figures using a square grid. • Find the perimeter of figures in centimetres (cm) and metres (m). • Find the perimeter of squares and rectangles. • Measure volume in millilitres (ml) and litres (l). • Measure capacity in ml and l. • Write volume in ml and l. • Write capacity in ml and l. • Solve word problems on volume and capacity. • Tell and write time in a.m. and in p.m., with increasing accuracy to the nearest minute. • Tell and write time using "past" and "to". • Tell and write time shown on different types of clocks (including analogue, 12hr, 24hr and those using roman numerals). • Measure time in seconds, hours and minutes. • Find starting time, ending time and duration to compare events. • Change minutes to seconds, and seconds to minutes.	• Measure and calculate the perimeter of a rectilinear figure in centimetres and metres. • Find the area of rectilinear shapes by counting squares. • Measure and estimate capacity volume. • Convert units of volume. • Read and tell the time using the 24-hour clock. • Convert time between analogue and digital 12- and 24-hour clocks. • Change time in minutes to seconds. • Change time in hours to minutes. • Change time in years to months. • Change time in months to years. • Find the duration, starting time and finishing time. • Solve word problems on time. • Count an amount of money and write it using decimals. • Compare different amounts of money. • Round money to the nearest £1 and to the nearest £10. • Estimate total amounts of money. • Solve problems involving money.	• Understand and use approximate equivalences between metric units and common imperial units. • Solve problems involving measurements using the four operations. • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres. • Calculate and compare the area of rectangles (including squares) • Estimate the area of irregular shapes. • Use scale diagrams to find the perimeter and the area of a figure. • Find and compare the volumes of solids. • Find and compare the capacity of rectangular boxes. • Find and compare the volumes of solids. • Find and compare the capacity of rectangular boxes. • Convert measurements of time. • Solve problems involving converting between units of time. • Use all four operations to solve problems involving using decimal notation, including scaling	notation up to three decimal places. • 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. • 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 (rectangles, triangles and parallelograms) • Calculate the area of rectangles parallelograms and triangles. • Use the area of rectangles to find the area of other types of polygons. • Find the volume of solids by counting unit cubes. • Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units. • Solve problems involving volume.

		• Show amounts of money in different ways. • Combine amounts to make a particular value. • Exchange coins and notes. • Compare amounts of money. • Calculate change. • Solve word problems on money of the same unit.	• Find the number of days using a calendar. • Know the number of days in each month, year and leap year. • Use the appropriate vocabulary associated with time. • Name the amount of money in pounds and pence. • Use different ways to show the same amount of money. • Add and subtract money in pounds and pence. • Calculate change in pounds and pence. • Solve word problems on money, including giving change.		
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Statistics

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum 2014 Objectives		• interpret and construct simple pictograms, tally charts, block diagrams and simple tables. • ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity. • ask and answer questions about totalling and comparing categorical data.	• interpret and present data using bar charts, pictograms and tables. • solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.	• interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. • solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	• solve comparison, sum and difference problems using information presented in a line graph. • complete, read and interpret information in tables, including timetables	• interpret and construct pie charts and line graphs and use these to solve problems. • calculate and interpret the mean as an average
White Rose Block and Sequence of lessons		Statistics: •	Statistics: •	Statistics: •	Statistics: •	Statistics: •
Knowledge		• Data is facts and figures. • A table in maths is a way to set out data so it is easy to record and see. • Tally marks are a quick way of keeping track of numbers in groups of five. • A pictogram uses pictures to represent data.	• Data is facts and figures. • A table in maths is a way to set out data so it is easy to record and see. • Tally marks are a quick way of keeping track of numbers in groups of five. • A pictogram uses pictures to represent data.	• Discrete data can only be shown in integers, for example, the number of children in a class. • Continuous data can take any value, including decimals.	• Continuous data can take any value, including decimals. • Line graphs can have more than one line on them representing different but related data.	• Mean is the total of all the values, divided by the number of values. • Median is the middle number in a list of numbers ordered from smallest to largest. • Range is the difference between the lowest value and the highest value. • Mode is the value that appears most often in a set of data. • Pie Charts are a special chart that uses "pie slices" to show relative sizes of data. • Continuous data can take any value, including decimals. • Line graphs can have more than one line on them representing different but related data. • 1 mile = 1.6km.
Skills		• Read and interpret information from pictograms, block diagrams, tally charts and tables.	• Draw picture graphs, and bar graphs and tables. • Read and interpret bar graphs, pictograms and tables.	• Use a table to show information. • Draw, read and interpret discrete and continuous data using appropriate	• Read, complete and interpret information in a timetable.	• Calculate and interpret the mean as an average. • Interpret and construct pie charts.

		• Construct pictograms, block diagrams, tally charts and tables. • Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity. • Ask and answer questions about totalling and comparing categorical data	• Solve problems (one step and two step) using information from bar graphs, pictograms and tables	methods (tables, picture graphs, bar graphs and time graphs). • Solve comparison, sum and difference problems using information from tables and graphs.	• Read, interpret and complete information in a table. • Read and interpret information from a line graph. • Solve word problems (including comparison, sum and difference problems) using information from a line graph.	• Interpret and construct line graphs. • Solve problems using information provided by graphs.
DfE and NCETM Ready To Progress Document					

Ratio and Proportion

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum 2014 Objectives						• 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 similar shapes where the scale factor is known or can be found. • solve problems involving unequal sharing and grouping using knowledge of fractions and multiples
White Rose Block and Sequence of lessons						Ratio: •

Knowledge						• Ratio says how much of one thing there is compared to another thing.
						• Ratios can be shown in different ways:
						  ➢ Use the ":" to separate the values: 3 : 1
						  ➢ Or we can use the word "to": 3 to 1
						  ➢ Or write it like a fraction: 3/1
						• Simplifying ratios means to reduce a ratio to its simplest form, you need to find a factor that you could divide both numbers by. Simplify these ratios by dividing

						both numbers by the same factor.
Skills						• Compare the relative sizes of quantities and numbers using ratios, where missing values can be found by using integer multiplication and division facts. • Solve problems involving similar shapes where the scale factor is known or can be found. • Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.
DfE and NCETM Ready to Progress Document						

Algebra

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum 2014 Objectives						• use simple formulae. • 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
White Rose Block and Sequence of lessons						Algebra: •
Knowledge						• Algebra is where numbers and quantities called variables are represented by letters and symbols in expressions and equations. • Algebraic expressions are mathematical phrase combining numbers and/or variables. • Algebraic expressions do not contain equality or inequality signs but may include other operators and grouping symbols. • In Algebraic expressions both sides of an equation are expressions. • Formula is a mathematical rule written using symbols, usually as an equation describing a certain relationship between quantities.
Skills						• Describe and complete a linear pattern (number sequence). • Write and evaluate algebraic expressions. • Write and use simple formulae. • Solve equations.

						• Find pairs of numbers that satisfy an equation with two unknowns. • Enumerate possibilities of combinations of two variables
DfE and NCETM Ready To Progress Document						

Progression in Fluency
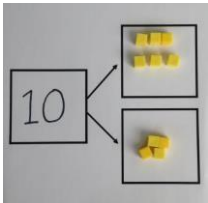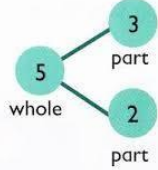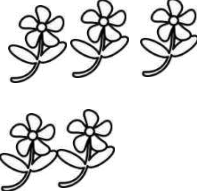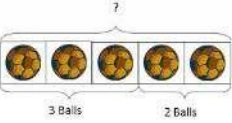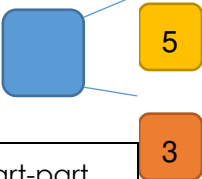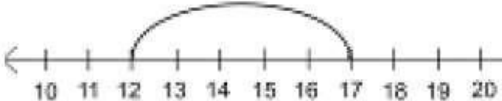
Year Group	KIRFs	Objectives
1	1	Count to and across 100 from any number
	2	Count, read and write number to 100 in numerals
	3	Count in 2, 5 and 10
	4	Read and write mathematical symbols: +, - and =
	5	Identify 'one more' and 'one less'
	6	Use number bonds and subtraction facts within 20
	7	Add and subtract 1-digit and 2-digit numbers to 20, including zero
	8	Recognise, find and name a half
	9	Recognise, find and name a quarter
	10	Measure and begin to record length, mass, volume and time
	11	Recognise and know the value of all coins and notes
	12	Use language to sequence events in chronological order
	13	Recognise and use language relating to dates
	14	Tell the time to the half-hour, including drawing clocks
	15	Recognise and name common 2-D shapes
	16	Recognise and name common 3-D shapes
2	17	Count in steps of 2s, 3s and 5s, and steps of 10
	18	Recognise place value in two-digit numbers
	19	Compare and order numbers up to 100 using <, > and =
	20	Read and write numbers to 100 in words and in numerals
	21	Recall and use number addition/subtraction facts to 20, and derive related facts
	22	Add and subtract mentally and with objects one- and two-digit numbers
	23	Understand and use the inverse relationship between addition and subtraction
	24	Know 2×, 5× and 10× tables, including recognising odd & even numbers
	25	Calculate mathematical statements using x and ÷ symbols
	26	Recognise, find, name and write 1/3, 1/4, 1/2 and 3/4 of size, shape or quantity
	27	Write simple fraction facts, e.g. 1/2 of 6 = 3
	28	Combine amounts of money to make a value, including using £ and p symbols
	29	Tell the time to the nearest 5 minutes, including drawing clocks
	30	Describe properties of 2-D shapes, including number of sides and symmetry
	31	Describe properties of 3-D shapes, including number of edges, vertices and faces
	32	Interpret and construct simple tables, tally charts and pictograms
3	33	Count in multiples of 4, 8, 50 and 100
	34	Recognise the place value of each digit in a 3 digit number
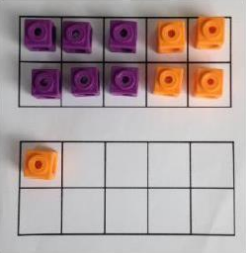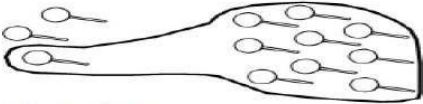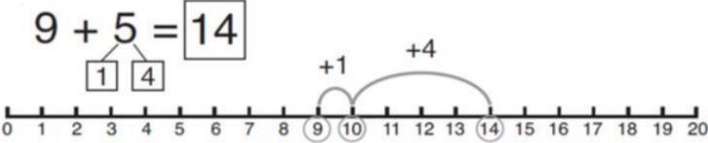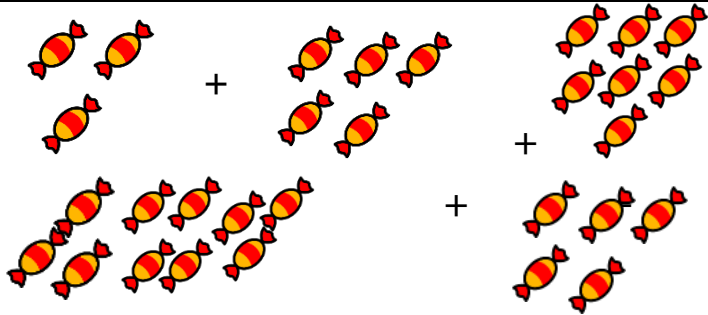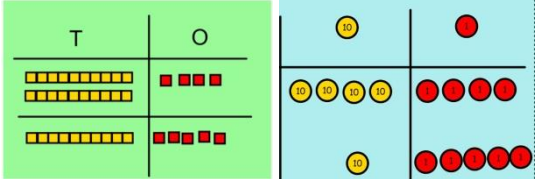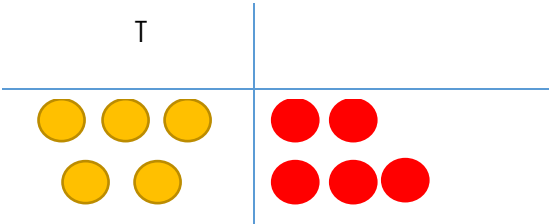
	35	Read and write numbers to 1000 in numerals and words
	36	Compare and order numbers up to 1000
	37	Add and subtract numbers mentally, including round numbers to HTU
	38	Add and subtract using standard column method
	39	Estimate answers to calculations and use the inverse to check answers
	40	Know tables up to 12 x 12
	41	Count up and down in tenths
	42	Understand that tenths are objectives or quantities divided into ten equal parts
	43	Compare and order simple fractions
	44	Recognise and show equivalent fractions
	45	Find and write fractions of a set of objects
	46	Add and subtract fractions with common denominators (less than one)
	47	Measure, compare and calculate measures using standard units
	48	Measure the perimeter of simple 2-D shapes
	49	Add and subtract money, including giving change
	50	Tell and write the time from an analogue clock, including using Roman numerals
	51	Estimate and read time to the nearest minute
	52	Identify horizontal, vertical, parallel and perpendicular lines
	53	Identify whether angles are greater or less than a right angle
	54	Interpret and present data using bar charts, pictograms and tables
	55	Count in multiples of 6, 7, 9,25 and 1000
	56	Find 1000 more and 1000 less
	57	Count backwards through zero, including negative numbers
	58	Recognise place value in four-digit numbers
	59	Round any number to the nearest 10, 100 or 1000
	60	Use place value and number facts to carry out mental calculations
	61	Use factor pairs and commutativity in mental calculations
	62	Use short multiplication method
	63	Recognise and use hundredths
4	64	Recognise and write decimal equivalents to ¼, ½ and ¾
	65	Divide one- or two-digit numbers by 10 and 100, using tenths and hundredths
	66	Round decimals with one decimal place to the nearest whole number
	67	Compare numbers up to two decimal places
	68	Convert between different units of metric measurement, including money
	69	Find the area of rectilinear shapes by counting squares
	70	Solve problems converting units of time
	71	Compare and classify shapes, including quadrilaterals and triangles
	72	Complete a simple symmetric figure with respect to a specific line of symmetry.
	73	Describe positions on a 2-D grid using co-ordinates

	74	Describe translations using a given unit to the left/right and up/down
	75	Interpret and present discrete and continuous data on appropriate graphs
5	76	Interpret negative numbers in context
	77	Read Roman numerals to 1000, including years
	78	Recognise and use square and cube numbers, and know the notation
	79	Use rounding to check answers and determine accuracy
	80	Identify multiples and factors, including finding factor pairs and common factors
	81	Use vocabulary: prime numbers, prime factors and composite numbers
	82	Know prime numbers up to 19
	83	Multiply and divide numbers by 10, 100 or 1000, including decimals
	84	Use long multiplication for multiplying numbers of up to 4 digits by one or two digits
	85	Divide numbers using standard written short division
	86	Convert between mixed numbers and improper fractions
	87	Compare and order fractions whose denominators are multiples of the same number
	88	Identify, name and write equivalent fractions including tenths and hundredths
	89	Add and subtract fractions with denominators that are multiples of the same number
	90	Multiply proper fractions and mixed numbers by whole numbers with support
	91	Read and write decimal numbers as fractions
	92	Round decimals with 2 decimals places to whole number or to one decimal place
	93	Read, write, order and compare numbers with up to 3 decimal places
	94	Recognise % symbol and explain as a fraction with denominator 100 (parts out of 100)
	95	Understand and use common approximate conversions between metric and imperial
	96	Measure and calculate the perimeter of composite rectilinear shapes
	97	Calculate the area of rectangles, and estimate the area of irregular shapes
	98	Use the properties of rectangles to find missing lengths and angles
	99	Distinguish between regular and irregular polygons
	100	Identify 3-d shapes from 2-d representations
	101	Know angles are measured in degrees and compare acute, obtuse and reflex angles
	102	Draw and measure angles to the nearest degree
	103	Identify angles at a point, in a turn and on a straight line
	104	Describe and represent the result of a reflection or translation
	105	Complete, read and interpret information in tables, including timetables
6	106	Use negative numbers to calculate intervals across zero
	107	Divide numbers using long division, interpreting the remainders as appropriate
	108	Use order of operations to carry out calculations
	109	Identify common factors, multiples and prime numbers
	110	Use common factors to simplify fractions
	111	Compare and order fractions of any size

	112	Add and subtract fractions with different denominators and mixed numbers
	113	Multiply simple pairs of proper fractions
	114	Divide proper fractions by whole numbers
	115	Calculate decimal fraction equivalents for simple fractions
	116	Multiply a number with up to two decimal places by whole numbers
	117	Use written division with answers of up to two decimal places
	118	Solve problems involving the calculation of percentages
	119	Recall and use equivalences between fractions, decimals and percentages
	120	Solve problems using ratio using multiplication and division facts
	121	Solve problems involving similar shapes where the scale factor is known
	122	Solve problems involving proportion, using knowledge of fractions and multiples
	123	Use simple formulae
	124	Generate and describe linear number sequences
	125	Express missing number problems algebraically
	126	Convert units of measure between smaller and larger units
	127	Convert between miles and kilometres
	128	Calculate the area of parallelograms and triangles
	129	Calculate and compare volume of cubes and cuboids
	130	Illustrate and name parts of a circle
	131	Finding missing angles in triangles, quadrilaterals and regular polygons
	132	Recognise vertically opposite angles and find missing angles
	133	Describe positions on the full co-ordinate grid
	134	Translate shapes on a co-ordinate grid and reflect in the axes
	135	Construct and interpret pie charts
	136	Calculate the mean as an average

Progression in Calculations – Addition

Objective and Strategies	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part-whole model	Use cubes to add two numbers together as a group or in a bar.	Use pictures to add two numbers together as a group or in a bar. 8 1	$4 + 3 = 7$ $10 = 6 + 4$ 5 3 Use the part-part whole diagram as shown above to move into the abstract.
Starting at the bigger number and counting on	Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	$12 + 5 = 17$ Start at the larger number on the number line and count on in ones or in one jump to find the answer.	$5 + 12 = 17$ Place the larger number in your head and count on the smaller number to find your answer.

Renaming to make 10	 6 + 5 = 11 Start with the bigger number and use the smaller number to make 10.	 $3 + 9 =$ $9 + 5 = \boxed{14}$ $\boxed{1}\ \boxed{4}$ 	Use pictures or a number line. Regroup or partition the smaller number to make 10.	7 + 4= 11 If I am at seven, how many more do I need to make 10. How many more do I add on now?
Adding three single digits	4 + 7 + 6= 17 Put 4 and 6 together to make 10. Add on 7. Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.	 Add together three groups of objects. Draw a picture to recombine the groups to make 10.		$\boxed{4} + 7 + \boxed{6} = \boxed{10} + \boxed{7}$ 10 $= \boxed{17}$ Combine the two numbers that make 10 and then add on the remainder.
Column method- no renaming	24 + 15= Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters. 	After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions. 		21 + 42 = $\begin{array}{r} 21 \\ + \underline{42} \end{array}$

Column method-renaming	Make both numbers on a place value grid.	Children can draw a pictoral representation of the columns and place value counters to further support their learning and understanding.	Start by partitioning the numbers before moving on to clearly show the exchange below the addition.
	146 + 527		$20 + 5$ $40 + 8$ $60 + 13 = 73$
	Add up the units and exchange 10 ones for one 10.		536 + 85 621 1 1 As the children introduce decimals with the same number of decimal places and different. Money can be used here.
	146 + 527		72.8 + 54.6 127.4 1 1
	Add up the rest of the columns, renaming the 10 counters from one column for the next place value column until every column has been added.		£ 2 3 . 5 9 + £ 7 . 5 5 £ 3 1 . 1 4 1 1 1
	This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100.		2 3 . 3 6 1 9 . 0 8 0 5 9 . 7 7 0 + 1 . 3 0 0 9 3 . 5 1 1 2 1 2
	As children move on to decimals, money and decimal place value counters can be used to support learning.		
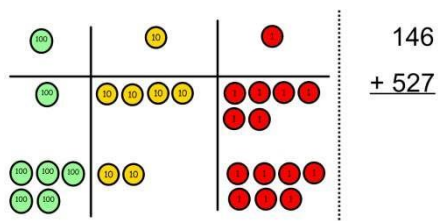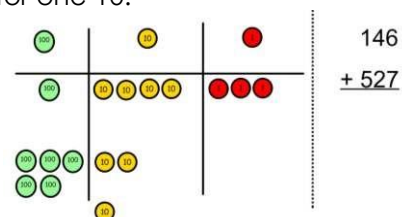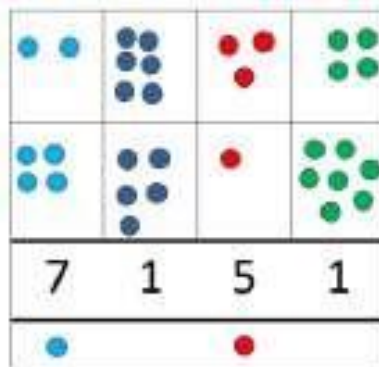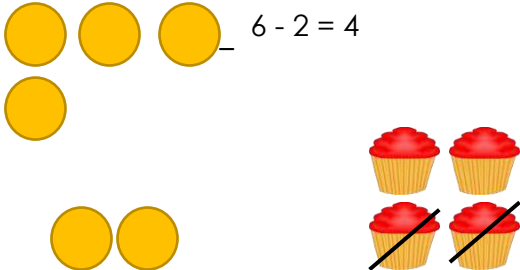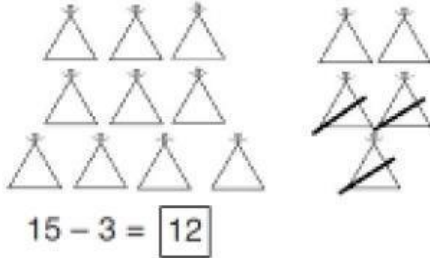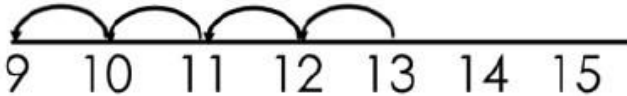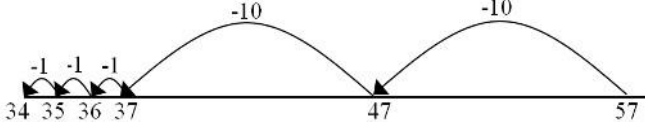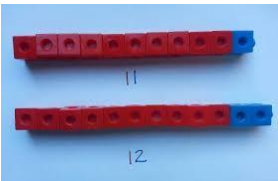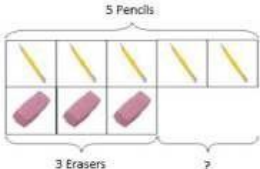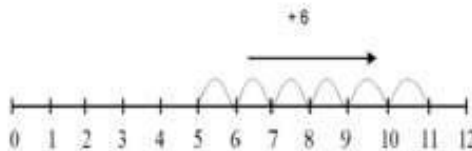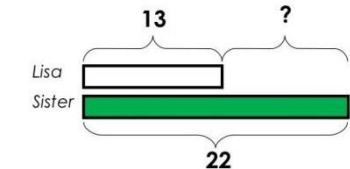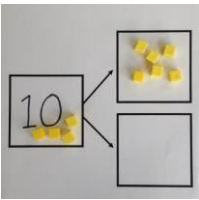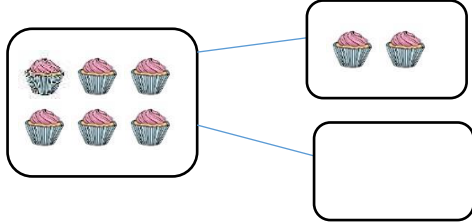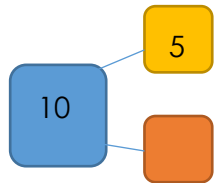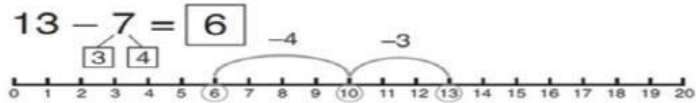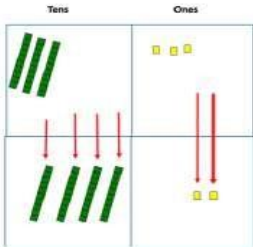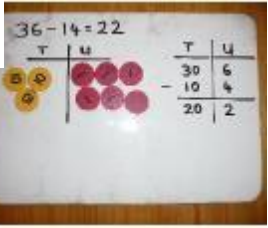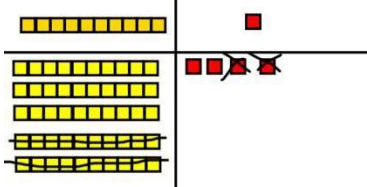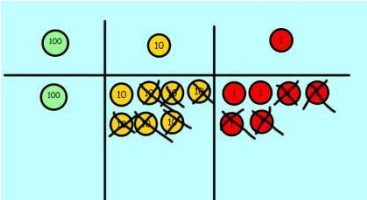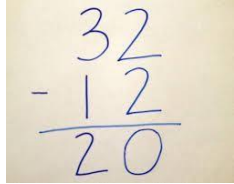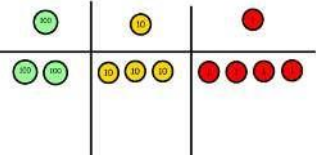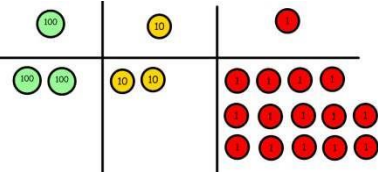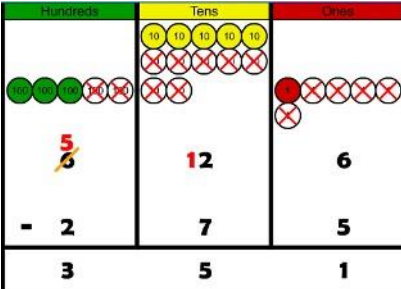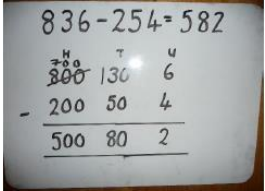
Progression in Calculations – Subtraction

Objective and Strategies	Concrete	Pictorial	Abstract
Taking away ones	Use physical objects, counters, cubes etc to show how objects can be taken away. 6 - 2 = 4	Cross out drawn objects to show what has been taken away. 15 – 3 = 12	18 -3= 15 8 – 2 = 6
Counting back	Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones. 13 – 4 Use counters and move them away from the group as you take them away counting backwards as you go.	Count back on a number line or number track 9 10 11 12 13 14 15 Start at the bigger number and count back the smaller number showing the jumps on the number line. -10 -10 -1 -1 -1 34 35 36 37 47 57 This can progress all the way to counting back using two 2 digit numbers.	Put 13 in your head, count back 4. What number are you at? Use your fingers to help.

Find the difference	Compare amounts and objects to find the difference. Use cubes to build towers or make bars to find the difference Use basic bar models with items to find the difference	 Count on to find the difference. Draw bars to find the difference between 2 numbers. **Comparison Bar Models** Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them. 	Hannah has 23 sandwiches, Helen has 15 sandwiches. Find the difference between the number of sandwiches.
Part -Part -Whole Model	 Link to addition- use the part whole model to help explain the inverse between addition and subtraction. If 10 is the whole and 6 is one of the parts. What is the other part? 10 - 6 =	Use a pictorial representation of objects to show the part part whole model. 	 Move to using numbers within the part whole model .
Make 10	 $14 - 9 =$ Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.	 Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.	$16 - 8=$ How many do we take off to reach the next 10? How many do we have left to take off?

Column method without renaming	Use Base 10 to make the bigger number then take the smaller number away. Show how you partition numbers to subtract. Again make the larger number first.	Draw the Base 10 or place value counters alongside the written calculation to help to show working Calculations 176 - 64 = 176 - 64 112	Draw the Base 10 or place value counters alongside the written calculation to help to show working $47 - 24 = 23$ $\begin{array}{r} 40 + 7 \\ - \ 20 + 4 \\ \hline 20 + 3 \end{array}$ This will lead to a clear written column subtraction.
Column method with renaming	Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges. Make the larger number with the place value counters Calculations 234 - 88 Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones. Calculations 234 - 88	 $42 - 18 = 24$ 	Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make. When confident, children can find their own way to record the exchange / renaming. Just writing the numbers as shown here shows that the child understands the method and knows when to exchange / regroup.	Children can start their formal written method by partitioning the number into clear place value columns. Moving forward the children use a more compact method.

Now I can subtract my ones.

Calculations
234
- 88
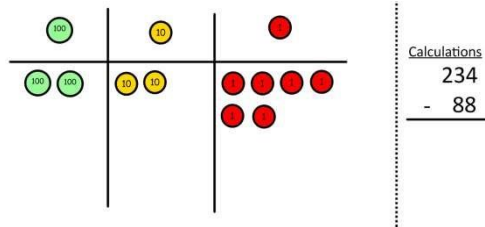
Now look at the tens, can I take away 8 tens easily? I need to exchange one hundred for ten tens.

Calculations
234
- 88
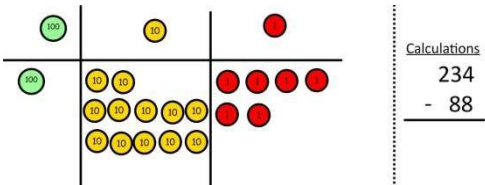
Now I can take away eight tens and complete my subtraction

Calculations
234
- 88
146
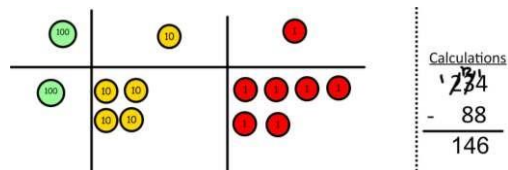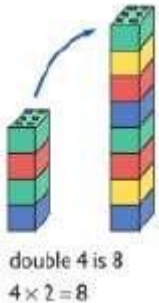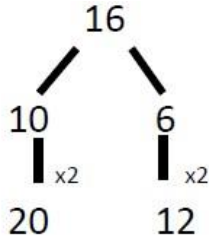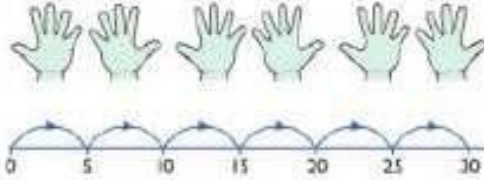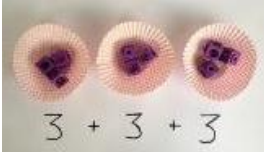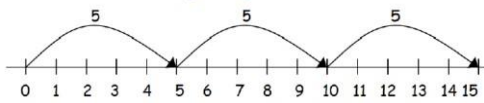
Show children how the concrete method links to the written method alongside your working. Cross out the numbers when renaming and show where we write our new amount.
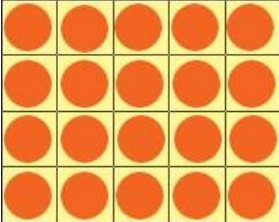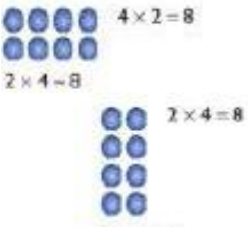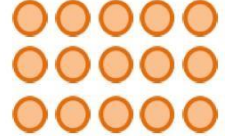
This will lead to an understanding of subtracting any number including decimals.

$$
\begin{array}{r}
\;5\;\;\;12\;\;\;1 \\
2\;\;\;\not{6}\;\;\;\not{3}\;\;.\;\;0 \\
-\quad\;\;2\;\;\;6\;\;.\;\;5 \\
\hline
2\;\;\;3\;\;\;6\;\;.\;\;5
\end{array}
$$

Progression in Calculations – Multiplication

Objective and Strategies	Concrete	Pictorial	Abstract
Doubling	Use practical activities to show how to double a number. double 4 is 8 $4 \times 2 = 8$	Draw pictures to show how to double a number. **Double 4 is 8**	Partition a number and then double each part before recombining it back together.
Counting in multiples	Count in multiples supported by concrete objects in equal groups.	Use a number line or pictures to continue support in counting in multiples.	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30

Repeated addition	There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?	Write addition sentences to describe objects and pictures.

Use different objects to add equal groups

2 add 2 add 2 equals 6

$5 + 5 + 5 = 15$

$2 + 2 + 2 + 2 + 2 = 10$

Arrays- showing commutative multiplication	Create arrays using counters/ cubes to show multiplication sentences.	Draw arrays in different rotations to find commutative multiplication sentences.	Use an array to write multiplication sentences and reinforce repeated addition.

$4 \times 2 = 8$

$2 \times 4 = 8$

$2 \times 4 = 8$

$4 \times 2 = 8$

Link arrays to area of rectangles.

$5 + 5 + 5 = 15$

$3 + 3 + 3 + 3 + 3 = 15$

$5 \times 3 = 15$

$3 \times 5 = 15$

Column multiplication	Children can continue to be supported by place value counters at the stage of multiplication.	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.	Start with long multiplication, reminding the children about lining up their numbers clearly in columns.
	64X3=192 It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.	8 × 59 = 8 × 60 – 8 8 × 6 = 48 8 × 60 = 480 480 – 8 = (472) 4 + 4 + 8 + 8 + 16 5 × 8 = 40 jugs.	If it helps, children can write out what they are solving next to their answer. 32 x 24 ────── 8 (4 x 2) 120 (4 x 30) 40 (20 x 2) 600 (20 x 30) ────── 768 This moves to the more compact method.
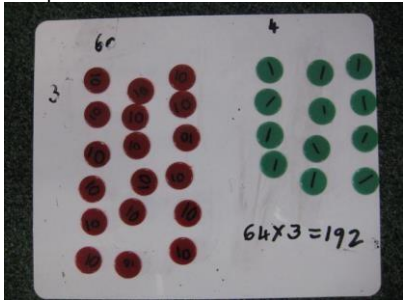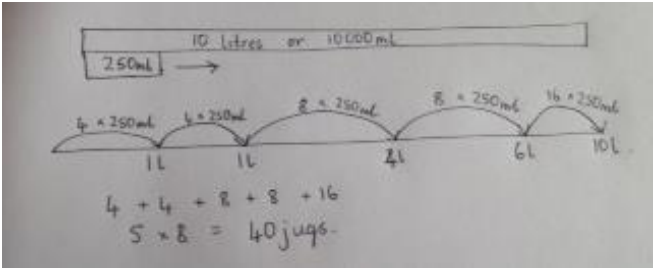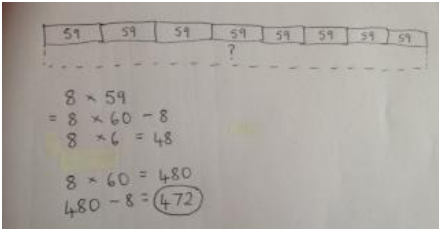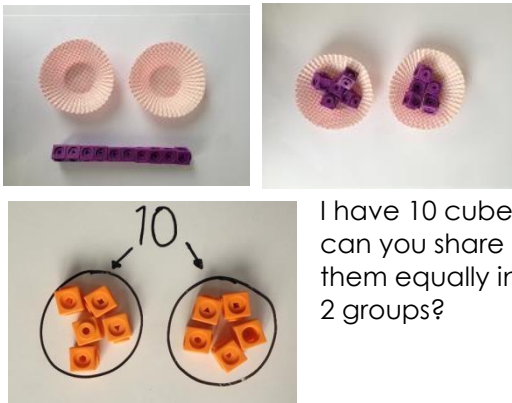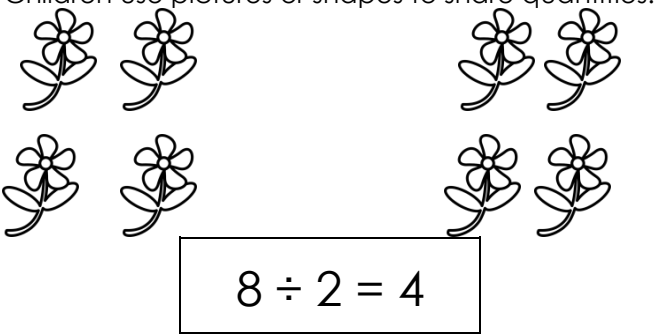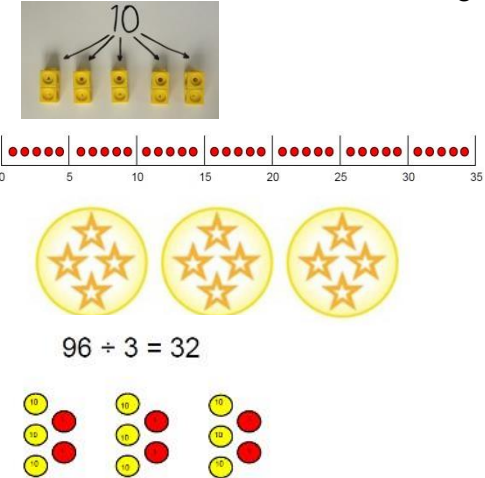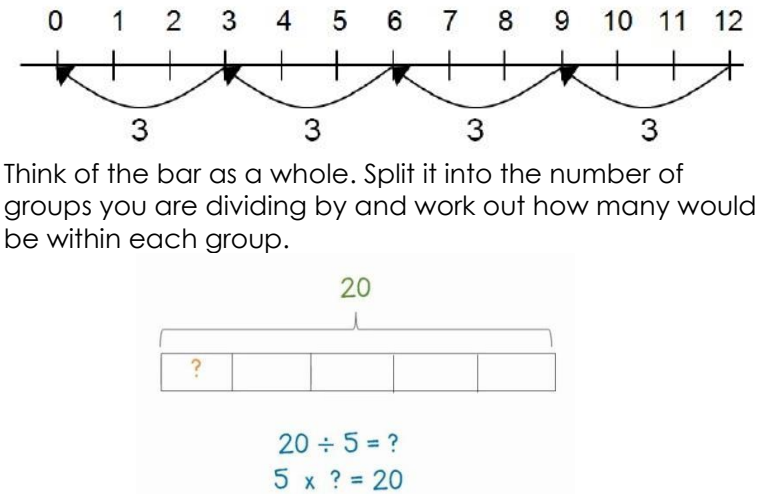
Progression in Calculations – Division

Objective and Strategies	Concrete	Pictorial	Abstract
Sharing objects into groups	I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities. $$8 \div 2 = 4$$	Share 9 buns between three people. $$9 \div 3 = 3$$
Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding. $$96 \div 3 = 32$$	Use a number line to show jumps in groups. The number of jumps equals the number of groups. Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group. $$20 \div 5 = ?$$ $$5 \times ? = 20$$	$$28 \div 7 = 4$$ Divide 28 into 7 groups. How many are in each group?

Division within arrays	Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	 Draw an array and use lines to split the array into groups to make multiplication and division sentences.	Find the inverse of multiplication and division sentences by creating four linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7
Division with partitioning	Divide 2 digit numbers by 1 digit, by paritioning into tens and ones and dividing them. Then add the answers together	Students can continue to use drawn diagrams with dots or circles to help them partition to divide numbers.	Complete written divisions using partitioning. 88 ÷ 2 = 40 + 4 = 44
Division with a remainder	14 ÷ 3 = Divide objects between groups and see how much is left over	Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder. Draw dots and group them to divide an amount and clearly show a remainder.	Complete written divisions and show the remainder using r. 29 ÷ 8 = 3 REMAINDER 5 ↑ ↑ ↑ ↑ dividend divisor quotient remainder

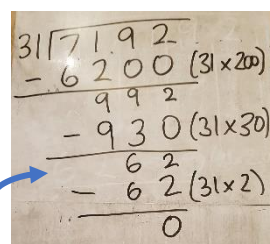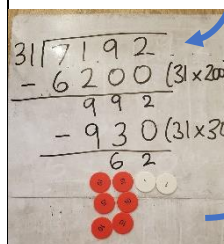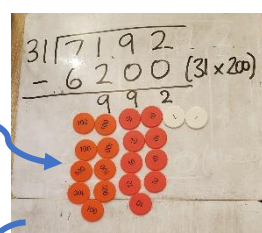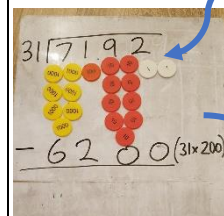| Short division	Divide a three digit number, then moving to a four digit number, by a one digit number using place value counters. 	Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups. Encourage them to move towards counting in multiples to divide more efficiently.	Begin with divisions that divide equally with no remainder. Move onto divisions with a remainder. Finally move into decimal places to divide the total accurately.
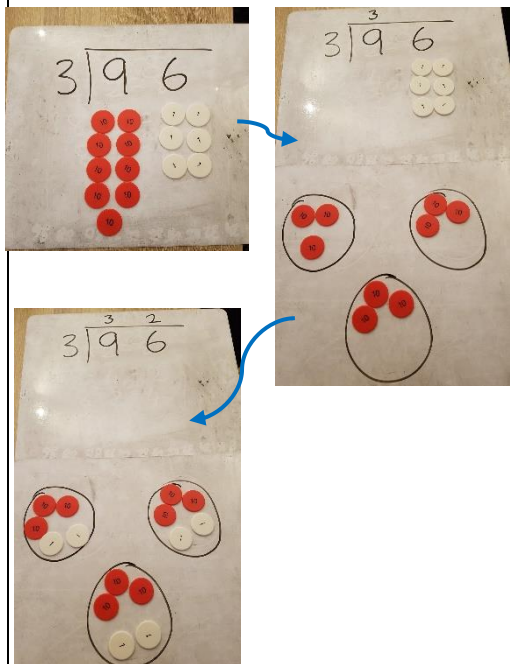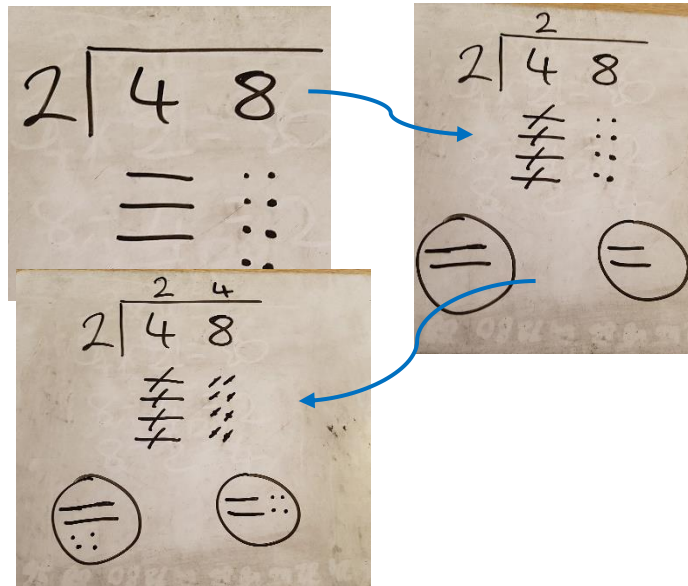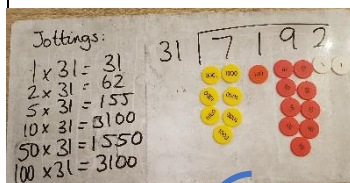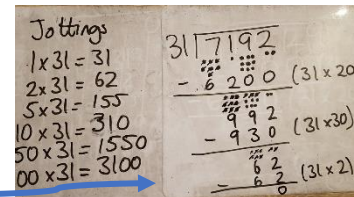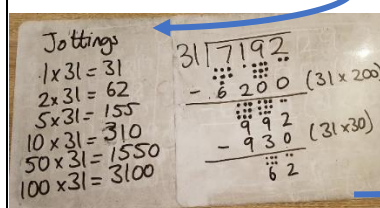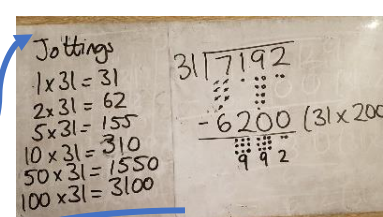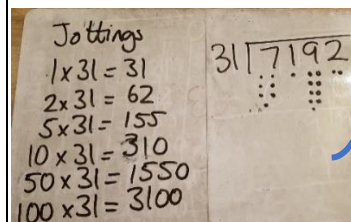
Long Division	Students will use repeated subtraction to divide 4 digits by 2 digits. Students will record jottings next to the calculation to help with the division.	Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.	Students move to completing calculations with just the jottings.
			Jottings: 1 x 31 = 31 2 x 31 = 62 5 x 31 = 155 10 x 31 = 310 50 x 31 = 1550 100 x 31 = 3100