HIGH LITTLETON CHURCH OF ENGLAND PRIMARY SCHOOL

MATHEMATICS PROGRESSION

Purpose:
Mathematics is a creative and highly interconnected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject. The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

The progression is based on 'White Rose Hub' small steps and the revised Early Learning Goals for the Early Years Foundation Stage.

Threshold Concept: Number and Place Value .

Key concepts in the Early Years	**Counting:** Includes verbal rote counting and object counting	**Cardinality:** Last number counted represents how many are in the se**t.**	**Subitising and Number:** Visual recognition of quantity of items (without counting one by one).	**Comparing:** Comparison of quantities by identifying more or less	**Composition:** Part-part-whole relationships.
	Development Matters and National Curriculum Objectives	**Sequence of Learning**	**Essential Prior knowledge for recall**	**Vocabulary**	**Key Questions for assessment and DFE ready to Progress criteria**
Early Years Foundation Stage	**Early Learning Goal** **Number:** - Have a deep understanding of numbers to 10, including the composition of each number. - Subitise (recognise quantities without counting) up to 5. - Automatically recall (without reference to - rhymes, counting or other aids) number - bonds up to 5 (including subtraction facts) and	**Autumn** - Match - Sort - Compare amount - Introduce 1 and 0 - Representing 1, 2. 3 - Comparing 1,2,3 - Introduce 2 - Composition of 1,2,3 - Introduce 3 - Introduce 4 - Introduce 5 - 1 more/1less **Spring** - Introduce 0 - Making pairs - One less - How many? Representing 0	**Development Matters 3-4** - Fast recognition of up to 3 objects, without having to count them individually ('subitising'). - Recite numbers past 5. - Say one number for each item in order: 1,2,3,4,5. - Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle'). - Show 'finger numbers' up to 5. - Link numerals and amounts: for example, showing the right	**Counting** number zero, one, two, three… to twenty and beyond zero, ten, twenty… one hundred none how many…? count, count (up) to count on (from, to) count back (from, to) count in ones, twos… tens… as many as greater smaller fewer too many more, less, many, few odd, even	Counting zero, one, two, three… to twenty and beyond how many are there altogether? What is one more than…? What is one less than…? Using a ten frame (or equivalent representation) can children identify the

	some number bonds to 10, including double facts. **Numerical Patterns:** - Verbally count beyond 20, recognising the pattern of the counting system. - Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity. - Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.	- Comparing numbers to 5 - Composition of 4 & 5 - Equal and unequal - Composition of numbers to 5 - 2 groups - Composition of numbers to 5 - 3 groups - Counting to 6, 7 and 8 - Composition of 6, 7, 8 - Sorting 6, 7, 8 - Matching 6, 7, 8 - Counting to 9 and 10 - Comparing numbers to 9 - Representing 9 and 10 - Sorting 9 and 10 - Ordering numerals to 10 - Composition of 9 and 10 - Comparing groups up to 10 - Number bonds to 10 **Summer** - Counting to 20 - Matching pictures and numerals - Missing Numbers - Ordering numbers to 20	number of objects to match the numeral, up to 5. - Experiment with their own symbols and marks as well as numerals. - Solve real world mathematical problems with numbers up to 5. **4-5:** - Count objects, actions and sounds - Subitise - Link the number symbol (numeral) with its cardinal number value. - Count beyond ten. - Compare numbers. - Understand the 'one more than/one less than' relationship between consecutive numbers. - Explore the composition of numbers to 10.	every other how many times? pattern, pair guess how many, estimate nearly, close to, about the same as just over, just under too many, too few, enough, not enough **Comparing and ordering numbers** the same number as, as many as *Of **two** objects/amounts:* greater, more, larger, bigger less, fewer, smaller *Of **three** or more objects/amounts:* greatest, most, biggest, largest least, fewest, smallest one more, ten more one less, ten less compare order size first, second, third… tenth last, last but one before, after next between above, below	number - how do you know? Count in steps of 2, 5 and 10
Year 1	**Pupils should be taught to:** - 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	**Autumn** - Sort objects - Count objects - Represent objects - Count, read and write forwards from any number 0-10 - Count, read and write backwards from any number 0-10 - Count one more - Count one less - One to one correspondence to start to compare groups - Compare groups using language such as equal, more/greater, less/fewer - Introduce <,> and = symbols	- Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number.	**Counting, properties of numbers and number sequences** number zero, one, two, three… to twenty and beyond zero, ten, twenty… one hundred none how many…? count, count (up) to, count on (from, to) count back (from, to) count in ones, twos… tens… more, less, many, few odd, even **Place value and ordering** *units, ones , tens* *exchange*	**RTP Y1** Maths_guidance_year_1.pdf White Rose Autumn Place Value Assessment https://whiterosemaths.com/resources/assessment/primary-assessment/end-of-block-assessments/ Summer Place Value to 100 Assessment

	- read and write numbers from 1 to 20 in numerals and words.	- Compare numbers - Order groups of objects - Order numbers - Ordinal numbers (1st, 2nd, 3rd…) - The number line - Count forwards and backwards and write numbers to 20 in numerals and words - Numbers from 11-20 - Tens and ones - Count one more and one less - Compare groups of objects - Compare numbers - Order groups of objects - Order numbers **Spring** - Numbers to 50 - Tens and ones - Represent numbers to 50 - One more one less - Compare objects within 50 - Compare numbers within 50 - Order numbers within 50 - Count in 2s - Count in 5s **Summer** - Counting to 100 - Partitioning numbers - Comparing numbers - Ordering numbers - One more, one less		*digit* *'teens' number* the same number as, as many as *equal to* *Of **two** objects/amounts:* greater, more, larger, bigger less, fewer, smaller *Of **three** or more objects/amounts:* greatest, most, biggest, largest, least, fewest, smallest one more, ten more, one less, ten less compare, order first, second, third… tenth, *eleventh…* last, last but one before, after, next between, *half-way between* *above, below* **Estimating** guess how many, estimate nearly, *roughly,* close to about the same as just over, just under too many, too few, enough, not enough	https://whiterosemaths.com/resources/assessment/primary-assessment/end-of-block-assessments/ See also mathematical talk section in white rose scheme of learning for key questions.
Year 2	**Pupils should be taught to:** - 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	- Count objects to 100 and read and write numbers in numerals and words - Represent numbers to 100 - Tens and ones with a part-whole model - Tens and ones using addition - Use a place value chart - Compare objects - Compare numbers - Order objects and numbers - Count in 2s, 5s and 10s - Count in 3s	- Read and write numbers from 1 to 20 in numerals and words - Identify and represent numbers using objects and pictorial representations including the number line - Use the language of more than/ less than (fewer), most, least, equal to when comparing the value of numbers - Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number	**Counting, properties of numbers and number sequences** number zero, one, two, three… to twenty and beyond zero, ten, twenty… one hundred zero, one hundred, *two hundred… one thousand* none how many…? count, count (up) to, count on (from, to) count back (from, to) count in ones, twos, *threes, fours, fives, tens and so on*	**RTP Y2** Maths_guidance_year_1.pdf White Rose Place Value Assessment https://whiterosemaths.com/wp-content/uploads/2018/08/Year-2-Place-Value_End-of-Block-Assessment.pdf See also mathematical talk section in white rose scheme of

	- read and write numbers to at least 100 in numerals and in words - use place value and number facts to solve problems.		- Count in multiples of twos, fives and tens - Can order numbers to 20 accurately - Understand how a number line and number grid is organised	more, less, many, few *tally* odd, even, every other how many times? *multiple of* *sequence* *continue* *predict* pattern, pair, *rule* **Place value and ordering** units, ones, tens, *hundreds* digit *one-, two- or three-digit number* 'teens' number *place, place value* *stands for, represents* *exchange* the same number as, as many as equal to *Of **two** objects/amounts:* greater, more, larger, bigger less, fewer, smaller *Of **three** or more objects/amounts:* greatest, most, biggest, largest least, fewest, smallest one more, ten more, one less, ten less compare, order, size first, second, third… tenth… twentieth *twenty-first, twenty-second…* last, last but one before, after, next between, half-way between above, below **Estimating** guess how many, estimate nearly, roughly, close to about the same as just over, just under, *exact, exactly* too many, too few, enough, not enough round, nearest, round to the nearest ten	learning for key questions.
Year 3	**Pupils should be taught to:** - count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number	- Hundreds - Represent numbers to 1000 - 100s, 10s and 1s - Number line to 1000	- Understand place value in numbers up to two digits - Read and write numbers up to 100	Place value, Digit Hundreds, Tens, Ones Estimate Number line Scale	**RTP Y3** Maths_guidance_year_3

	- 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.	- Find 1, 10, 100 more or less than a given number - Compare objects to 1000 - Compare numbers to 1000 - Order numbers - Count in 50s	- Use zero as a place holder in two-digit numbers - Use and interpret a number line to represent numbers - Understand place value in numbers up to 1000 - Use <, > and = symbols - Count in steps of 2, 3 and 5 from 0 - Count in tens from any number, forward and backward	Multiple More, Less Positive Number line **Notation** Use of <, > and = symbols when comparing numbers	White Rose Place Value Assessment Name 725 572 257 See also mathematical talk section in white rose scheme of learning for key questions.
Year 4	**Pupils should be taught to** - 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.	- Roman numerals to 100 - Round to the nearest 10 - Round to the nearest 100 - Count in 1000s - 1000s, 100s, 10s,1s - Partitioning - Number line to 10,000 - 1000 more or less - Compare numbers - Order numbers - Round to the nearest 1000 - Count in 25s - Negative numbers	- Understand place value in numbers up to three digits - Know the Roman numerals I, V and X - Read Roman numerals up to XII - Use zero as a place holder in two- and three-digit numbers - Use and interpret a number line to represent numbers	Tenths, hundredths, decimal (places), round (to nearest), thousand more/less than, negative integers, count through zero, Roman numerals I to C	RTP Y4 DfE Guidance White Rose Place Value Assessment https://whiterosemaths.com/wp-content/uploads/2018/08/Year-4-Place-Value_End-of-Block-Assessment.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 5	**Pupils should be taught to:** - read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	- Numbers to 10,000 - Roman numerals to 1,000 - Round to the nearest 10, 100, 1,000	- Recognise and use factor pairs and commutativity in mental calculations	Place value, Digit Roman numerals Negative number Multiple, (Common) factor	RTP Y5 DfE Guidance

	- 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.	- Numbers to 100,000 - Compare and order numbers to 100,000 - Round numbers within 100,000 - Numbers to a million - Counting in 10s, 100s, 1,000s, 10,000s, 100,000s - Compare and order numbers to one million - Round numbers to one million - Negative numbers	- Understand and use place value in four-digit numbers - Know Roman numerals from I to C - Read numbers written in Roman numerals up to 100 - Count forwards and backwards in whole number steps	Divisible Factor pairs, Prime number, Composite number, Square number, Cube number Power **Notation** 5^2 is read as '5 to the power of 2' or '5 squared' and means '2 lots of 5 multiplied together' 5^3 is read as '5 to the power of 3' or '5 cubed' and means '3 lots of 5 multiplied together'	White Rose Place Value Assessment https://whiterosemaths.com/wp-content/uploads/2018/08/Year-5-Place-Value_End-of-Block-Assessment.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 6	**Pupils should be taught to:** - 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.	- Numbers to ten million - Compare and order any number - Round any number - Negative numbers	- Understand and use place value in numbers with up to seven digits - Multiply and divide whole numbers by 10, 100, 1000 - Multiply and divide numbers with one decimal place by 10, 100, 1000 - Know the meaning of 'factor' and 'multiple' and 'prime'	Place value, Digit Negative number (Common) multiple, (Common) factor Divisible Prime number, Composite number Approximate (noun and verb) Round Decimal place Estimate (noun and verb) Accurate, Accuracy	RTP Y6 DfE Guidance White Rose Number and Place Value Assessment https://whiterosemaths.com/wp-content/uploads/2018/09/Year-6-Place-Value_End-of-Block-Assessment.pdf See also mathematical talk section in white rose scheme of learning for key questions.

Threshold Concept: Addition and Subtraction:

Key concepts in the Early Years	**Addition and Subtraction**	**Comparing:** Comparison of quantities by identifying more or less	**Composition:** Part-part-whole relationships.		
	Development Matters, National Curriculum and Statutory Framework Objectives	**Sequence of Learning**	**Essential Prior knowledge for recall**	**Vocabulary**	**Key Questions for assessment**
Early Years Foundation Stage	**Early Learning Goal** **Numerical Patterns:** **Early Learning Goal** **Number:** - Have a deep understanding of numbers to 10, including the composition of each number. - Subitise (recognise quantities without counting) up to 5. - Automatically recall (without reference to - rhymes, counting or other aids) number - bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. **Numerical Patterns:** - Verbally count beyond 20, recognising the pattern of the counting system. - Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity. - Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.	**Autumn** - Comparing amounts - 1 more/less **Spring** - One less - Composition of 4 & 5 - Equal and unequal - Composition of numbers 5 - 2 groups - How many all together - Composition of number to 5 - 3 groups - How many are we hiding? - Making 6 - Combining 2 groups - Composition of 6,7,8 - Comparing numbers to 9 - Bonds to 9 - Composition of 9 and 10 - Bonds to 10 - Counting back from 10 **Summer** - Ten frame addition with 10 frames - Subtraction from 10 frames - Taking away - Doubling - Grouping	**Development Matters 3-4** - Solve real world mathematical problems with numbers up to 5. **4-5:** - Compare numbers. - Understand the 'one more than/one less than' relationship between consecutive numbers. - Explore the composition of numbers to 10. - Automatically recall number bonds for numbers 0–10	**Adding and subtracting** add, more, and make, sum, total, altogether score double one more, two more, ten more… how many more to make… ? how many more is… than…? take (away), leave how many are left/left over? how many have gone? one less, two less… ten less… how many fewer is… than…? difference between is the same as	With a selection of objects - how many more to make… ? how many more is… than…? how many fewer is… than…? Can you add 4 and 5 by counting on? Take away three, how many are left?

Year 1	**Pupils should be taught to:** - 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.	**Autumn** - Part-whole model - Addition symbol - Fact families - addition facts - Find number bonds for numbers within 10 - Systematic methods for number bonds within 10 - Number bonds within 10 - Compare number bonds - Addition-adding together - Finding a part - Subtraction - taking away, how many left? Crossing out - Introducing the subtraction symbol - Subtraction - finding a part, breaking apart - Fact families - the 8 facts - Subtraction - counting back - Subtraction - finding the difference - Comparing addition and subtraction statements a+b>c - Comparing addition and subtraction statements a+b>c+d **Spring** - Adding by counting on - Find & make number bonds - Add by making 10 - Subtraction - Not crossing 10 - Related facts - Compare number sentence	- Order numbers to 20 accurately - Understand how a number line is organised - Count accurately from 0 to 21 - Count up to 20 objects accurately and attribute the correct numeral to label the set - Subitise small groups of objects (i.e. can say how many there are without needing to count each individual object.) - Understand the 'cardinal' value of a set/ array. (Once it has been counted they understand that they don't need to count again.) - Identify the number that is one more than a number - Identify the number that is one less than a number - Know addition and subtraction facts to and from 10 - Know addition and subtraction facts within 10 - Know addition and subtraction facts to and from 20 - Know addition and subtraction facts within 20 - Pupils need to be able to count on and back in ones from any given number to 20. - Pupils need to be able to read, write and order numbers to at least 20	**Addition and subtraction** *+*, add, more, *plus* make, sum, total, altogether double, *near double* one more, two more… ten more how many more to make…? how many more is… than…? *how much more is…?* *-, subtract*, take (away), *minus* leave how many are left/left over? how many are gone? one less, two less, ten less… how many fewer is… than…? *how much less is…?* difference between *half, halve* *=, equals, sign,* is the same as	White Rose Addition and Subtraction Assessment https://whiterosemaths.com/resources/assessment/primary-assessment/end-of-block-assessments/ See also mathematical talk section in white rose scheme of learning for key questions.
Year 2	**Pupils should be taught to:** - 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	- Fact families - addition and subtraction bonds to 20 - Check calculations - Compare number sentences - Related facts - Bonds to 100 (tens) - Add and subtract 1s - 10 more and 10 less - Add and subtract 10s - Add a 2-digit and 1-digit number - crossing 10	- Understand the value of digits in two-digit numbers - Interpret a mathematical statement involving the symbols + and = or – and = - Add and subtract one- and two-digit numbers to 20, including 0	**Addition and subtraction** +, add, *addition*, more, plus make, sum, total, altogether double, near double one more, two more… ten more… *one hundred more* how many more to make…? how many more is… than…? how much more is…? -, subtract, take away, minus leave, how many are left/left over?	White Rose Addition and Subtraction Assessment https://whiterosemaths.com/wp-content/uploads/2018/09/Year-2-Addition-and-Subtraction.pdf See also mathematical talk section in white rose scheme of

	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.	- Subtract a 1-digit number from a 2-digit number - crossing ten - Add two 2-digit numbers - not crossing ten - add ones and add tens - Add two 2-digit numbers - crossing tens - add ones and add tens - Subtract a 2-digit number from a 2-digit number - not crossing ten - Subtract a 2-digit number from a 2-digit number - crossing ten - subtract ones and tens - Bonds to 100 (tens and ones) - Add three 1-digit numbers		one less, two less… ten less… *one hundred less* how many less is… than…? how much fewer is…? difference between half, halve =, equals, sign, is the same as *tens boundary*	learning for key questions.
Year 3	**Pupils should be taught to:** - 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 multiples of 100 - Add and subtract 3-digit and 1-digit numbers - not crossing 10 - Add 3-digit and 1-digit numbers - crossing 10 - Subtract a 1-digit number from a 3-digit number - crossing 10 - Add and subtract 3-digit and 2-digit numbers -not crossing 100 - Add 3-digit and 2-digit numbers - crossing 100 - Subtract a 2-digit number from a 3-digit number - crossing 100 - Add and subtract 100s - Spot the pattern - making it explicit - Add and subtract 2-digit and 3-digit numbers - not crossing 10 or 100 - Add a 2-digit and 3-digit number - crossing 10 and 100 - Subtract a 2-digit number from a 3-digit number - crossing 10 or 100 - Add two 3-digit numbers - not crossing 10 or 100 - Add two 3-digit numbers - crossing 10 or 100	- Know that addition and subtraction are inverse operations - Recall addition and subtraction facts to 20 - Derive addition and subtraction facts to 100 - Add and subtract two-digit numbers and ones (or tens) mentally	Calculation, Calculate Addition, Subtraction Sum, Total, Difference, Minus, Less Column addition, Column subtraction Exchange Operation Estimate Inverse, Operation	White Rose Addition and Subtraction Assessment https://whiterosemaths.com/wp-content/uploads/2018/09/Year-3-Addition-and-Subtraction.pdf See also mathematical talk section in white rose scheme of learning for key questions.

		- Subtract a 3-digit number from a 3-digit number - no exchange - Subtract a 3-digit number from a 3-digit number - exchange - Estimate answers to calculations - Check			
Year 4	**Pupils should be taught to:** - 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 1s, 10s, 100s, and 1000s - Add two 4-digit numbers - no exchange - Add two 4-digit numbers - one exchange - Add two 4-digit numbers - more than one exchange - Subtract two 4-digit numbers - no exchange - Subtract two 4-digit numbers - one exchange - Subtract two 4-digit numbers - more than one exchange - Efficient subtraction - Estimate answers - Checking strategies	- Find 100 more or less than a given number - Use column addition and subtraction for numbers up to three digits	Addition Subtraction Sum, Total Difference, Minus, Less Column addition Column subtraction Exchange Operation Estimate	White Rose Addition and Subtraction Assessment https://whiterosemaths.com/wp-content/uploads/2018/10/Year-4-Addition-and-Subtraction_v2.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 5	**Pupils should be taught to:** - 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.	- Add whole numbers with more than 4 digits (column method) - Subtract whole numbers with more than 4 digits (column method) - Round to estimate and approximate - Inverse operations (addition and subtraction) - Multi-step addition and subtraction problems	- Add and subtract numbers mentally, including a three-digit number and ones, tens or hundreds - Use column addition and subtraction for numbers up to four digits - Estimate the answer to a calculation	Addition Subtraction Sum, Total Difference, Minus, Less Column addition Column subtraction Exchange Operation Estimate	White Rose Addition and Subtraction Assessment https://whiterosemaths.com/wp-content/uploads/2018/10/Year-5-Addition-and-Subtraction_v2.pdf See also mathematical talk section in white rose scheme of learning for key questions.

Year 6	**Pupils should be taught to:** - 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.	- Add and subtraction whole numbers	- Use column addition and subtraction for numbers with more than four digits	Addition Subtraction Sum, Total Difference, Minus, Less Column addition Column subtraction Exchange Operation Estimate	White Rose Four Operations Assessment A https://whiterosemaths.com/wp-content/uploads/2018/10/Year-6-Four-Operations-A_v2.pdf Assessment B https://whiterosemaths.com/wp-content/uploads/2018/10/Mini-Assessment-Block-3_Year-6-Four-Operations-B_v2.pdf See also mathematical talk section in white rose scheme of learning for key questions.

Threshold Concept : Multiplication and Division:

Key Concepts in Early Years	**Multiplying and Dividing**				
	Development Matters and National Curriculum Objectives	**Sequence of Learning**	**Essential Prior knowledge for recall**	**Vocabulary**	**Key Questions for assessment**
Early Years Foundation Stage	**Early Learning Goal:** Numerical Patterns: .Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally	- Combining 2 groups - Combining 3 groups - Doubling - Sharing and grouping - Odd and even	**Development Matters** **3-4:** Solve real world mathematical problems with numbers up to 5. **4-5:** Count objects, actions and sounds Explore the composition of numbers to 10.	sharing doubling halving number patterns groups of lots of how many? equal	What is double…? What is half of…? Can you share these object between…? Count in steps of 2, 5 and 10
Year 1	**Pupils should be taught to:** - 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.	- Count in 10s - Make equal groups - Add equal groups - Make arrays - Make doubles - Make equal groups - grouping - Make equal groups - sharing	- Pupils need to be able to read, write and order numbers to at least 20 - Subitise small groups of objects (i.e. can say how many there are without needing to count each individual object.)	Once, twice, three, five times, multiple of times Multiply, multiply by, repeated addition, array, row, column, double, halve, share, share equally, group in pairs, threes, etc., equal groups of, divide, divided by, left over	White Rose Multiplication and Division Assessment https://whiterosemaths.com/resources/assessment/primary-assessment/end-of-block-assessments/ See also mathematical talk section in white rose scheme of learning for key questions.
Year 2	**Pupils should be taught to:** - 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	**Autumn** - Recognise equal groups - Make equal groups - Add equal groups - Multiplication sentences using the X symbol - Multiplication sentences from pictures - Use arrays - 2 times-table	- Count from zero in 2s, 5s and 10s - Use concrete objects to solve problems involving multiplication and division - Use pictorial representations to solve problems involving multiplication and division	*lots of, groups of* *x, times, multiply, multiplied by* *multiple of* *once, twice, three times,* *four times, five times… ten times…* *times as (big, long, wide and so on)* *repeated addition* *array* *row, column* double, halve	White Rose Multiplication Assessment https://whiterosemaths.com/wp-content/uploads/2018/11/Year-2-Multiplication-1.pdf Division Assessment https://whiterosemaths.com/wp-content/upl

	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	- 5 times-table - 10 times-table **Spring** - Make equal groups - sharing - MAke equal groups - grouping - Divide by 2 - Odd & even numbers - Divide by 5 - Divide by 10	- Use arrays to solve problems involving multiplication and division	share, *share equally* *one each, two each, three each…* *group in pairs, threes… tens* *equal groups of* *÷, divide, divided by, divided into*, left, left over	oads/2019/01/Year-2-Division.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 3	**Pupils should be taught to:** - 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.	**Autumn** - Multiplication - equal groups - 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 **Spring** - Comparing statements - Related calculation - Multiply 2-digits by 1 digit - Divide 2 digits by 1 digit - Scaling - How many ways?	- Recall multiplication and division facts for 2, 5 and 10 multiplication tables - Understand that multiplication and division are inverse operations - Understand that multiplication is commutative	Calculation Calculate Mental arithmetic Multiplication table, Times table Multiply, Multiplication Times Product Commutative Divide, Division Inverse Operation Estimate	White Rose Multiplication and Division Assessment Autumn - https://whiterosemaths.com/wp-content/uploads/2018/10/Mini-Assessment-Block-3_Year-3-Multiplication-and-Division.pdf Spring - https://whiterosemaths.com/wp-content/uploads/2019/01/Year-3-Multiplication-and-Division.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 4	**Pupils should be taught to:** - 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	- Multiply by 10 - Multiply by 100 - Divide by 10 - Divide by 100 - Multiply by 1 and 0 - Divide by 1 - Multiply and divide by 6 - 6 times table and division facts - Multiply and divide by 9	- Recall multiplication and division facts for 2, 3, 4, 5, 8 and 10 multiplication tables - Understand that multiplication and division are inverse operations	Mental arithmetic Place value Multiply, Multiplication, Times, Product Commutative Divide, Division Tenth, Hundredth Factor, Factor pairs Short multiplication Operation	White Rose Multiplication and Division Autumn Assessment https://whiterosemaths.com/wp-content/uploads/2018/11/Year-4-Multiplication-and-Division.pdf

	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.	- 9 times table and division facts - Multiply and divide by 7 - 7 times table and division facts - 11 and 12 times table - Multiply 3 numbers - Factor pairs - Efficient multiplication - Written methods - Multiply 2-digits by 1-digit - Multiply 3-digits by 1-digit - Divide 2-digits by 1-digit - Divide 3-digits by 1-digit - Correspondence problems		Estimate	Multiplication and Division Spring Assessment A https://whiterosemaths.com/wp-content/uploads/2019/01/Year-4-Multiplication-and-Division-A.pdf Multiplication and Division Spring Assessment B https://whiterosemaths.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-1-Year-4-Multiplication-and-Division-B.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 5	**Pupils should be taught to:** - 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	- multiples - factors - common factors - prime factors - square numbers - cube numbers - multiply by 10, 100, 1000 - divide by 10, 100, 1000 - multiples of 10, 100, 1000	- Recall multiplication facts for multiplication tables up to 12 × 12 - Recall division facts for multiplication tables up to 12 × 12 - Find factor pairs of a given number - Understand the commutativity of multiplication - Multiply and divide a two-digit number by 10, 100 - Multiply a three-digit number by a one-digit number using short multiplication	Multiply, Multiplication, Times, Product Commutative Divide, Division, Divisible Divisor, Dividend, Quotient, Remainder Factor Short multiplication, Long multiplication Short division Operation Estimate **Notation** Remainders are often abbreviated to ‘r’	White Rose Multiplication and Division Autumn Assessment https://whiterosemaths.com/wp-content/uploads/2018/11/Year-5-Multiplication-and-Division.pdf Spring Assessment https://whiterosemaths.com/wp-content/uploads/2019/01/Year-5-Multiplication-and-Division.pdf See also mathematical talk section in white rose scheme of learning for key questions.

	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, 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.				
Year 6	**Pupils should be taught to:** - 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	- Multiply up to a 4-digit number and by a 1-digit number - Short division - Division using factors - Long division - Common factors - Common multiples - Prime numbers - Squares and cubes - Order of operations - Mental calculations and estimation - Reason from known facts	- Recall multiplication facts for multiplication tables up to 12 × 12 - Recall division facts for multiplication tables up to 12 × 12 - Understand the commutativity of multiplication and addition - Multiply a three-digit number by a two-digit number using long multiplication	Mental arithmetic Place value Multiply, Multiplication, Times, Product Commutative Divide, Division Tenth, Hundredth Factor, Factor pairs Short multiplication Operation Divisor, Dividend, Quotient, Remainder Short division Long division Remainder Operation Estimate **Notation** Remainders are often abbreviated to ‘r’	White Rose Four Operations Assessment A https://whiterosemaths.com/wp-content/uploads/2018/10/Year-6-Four-Operations-A_v2.pdf Assessment B https://whiterosemaths.com/wp-content/uploads/2018/10/Mini-Assessment-Block-3_Year-6-Four-Operations-B_v2.pdf See also mathematical talk section in white rose scheme of

	appropriate, interpreting remainders according to the context - perform mental calculations, including with mixed operations and large numbers - identify common factors, common multiples and prime 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.				learning for key questions.

Threshold Concept: Use fractions decimals and percentages

	Development Matters and National Curriculum Objectives	Sequence of Learning	Essential Prior knowledge for recall	Vocabulary	Key Questions for assessment
Year 1	**Pupils should be taught to:** - 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.	- Find a half - Find a quarter	- Know the language of double and half - Know the meaning of the word 'equal'	Whole, equal parts, four equal parts, one half, two halves, a quarter, two quarters	White Rose Fractions Assessment https://whiterosemaths.com/resources/assessment/primary-assessment/end-of-block-assessments/ See also mathematical talk section in white rose scheme of learning for key questions.
Year 2	**Pupils should be taught to:** - recognise, find, name and write fractions ⅓, 1 /4, 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	- Make equal parts - Recognise a half - Find a half - Recognise a quarter - Find a quarter - Recognise a third - Find a third - Unit fractions - Non-unit fractions - Equivalence of ½ and 2/4 - Find three quarters - Count in fractions	- Recognise a half as one of two equal parts of an object, shape or quantity - Recognise a quarter as one of four equal parts of an object, shape or quantity	*part, equal parts* *fraction* *one whole* *one half, two halves* *one quarter, two… three… four quarters*	White Rose Fractions Assessment https://whiterosemaths.com/wp-content/uploads/2019/02/Primary_Spring_Mini_Assessments/Spring-Block-4-Mini-Assessment-Year-2-Fractions.pdf See also mathematical talk section in white rose scheme of learning for key questions.

Year 3	**Pupils should be taught to:** - 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.	**Spring** - Unit and non-unit fractions - Making the whole - Tenths - Count in tenths - Tenths as decimals - Fractions on a number line - Fractions of a set of objects **Summer** - Equivalent fractions - Compare fractions - Order fractions - Add fractions - Subtract fractions	- Recognise, find, name and write the fractions $^1/_3$, $^1/_4$, $^2/_4$ and $^3/_4$ of a length, shape, set of objects or quantity - Write simple fraction statements; e.g. $^1/_2$ of 6 = 3 - Recognise the equivalence of $^2/_4$ and ½ - Understand place value in numbers up to 1000 - Connect the ten times table to place value - Recognise and write unit and non-unit fractions - Understand unit and non-unit fractions as numbers on a number line	Fraction Numerator Denominator Equivalent (fraction) Compare Greater than, less than **Notation** Horizontal bar for fractions Use of <, > and = symbols when comparing fractions	White Rose Fractions Assessment Spring - https://whiterosemaths.com/wp-content/uploads/2019/03/Primary_Mini_Assessments/Spring-Block-5-Mini-Assessment-Year-3-Fractions.pdf Summer - https://whiterosemaths.com/wp-content/uploads/2019/04/2019/04/2019/04/Year-3-Fractions.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 4	**Pupils should be taught to:** - 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	- What is a fraction? - Equivalent fractions - Fractions greater than 1 - Count in fractions - Add 2 or more fractions - Subtract 2 fractions - Subtract from whole amounts - Calculate fractions of a quantity - Problem solving - calculate quantities - Recognise tenths and hundredths - Tenths as decimals - Tenths on a place value grid - Tenths on a number line - Divide 1-digit by 10 - Divide 2-digits by 10 - Hundredths	- Recognise and use tenths - Divide one digit numbers by 10	Place value Tenth, hundredth Decimal Divide Fraction Numerator Denominator Tenth Hundredth Decimal **Notation** Decimal point t, h notation for tenths, hundredths	White Rose Fractions Assessment https://whiterosemaths.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-3-Year-4-Fractions_Assessment.pdf Decimals Spring Assessment https://whiterosemaths.com/wp-content/uploads/2019/02/Primary_Spring_Mini_Assessments/Spring-Block-4-Mi

	- 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.	- Hundredths as decimals - Hundredths on a place value grid - Divide 1 or 2-digits by 100			ni-Assessment-Year-4-Decimals.pdf Decimals Summer Assessment https://whiterosemaths.com/wp-content/uploads/2019/04/2019/04/2019/04/Year-4-Decimals.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 5	**Pupils should be taught to:** - 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, ⅖ + ⅘ = 6/5 = 1 ⅕ - 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 diagram	- Equivalent fractions - Improper fractions to mixed numbers - Mixed numbers to improper fractions - Number sequences - Compare and order fractions less than 1 - Compare and order fractions more than 1 - Add and subtract fractions - Add fractions within 1 - Add 3 or more fractions - Add fractions - Decimals as fractions - Understand thousandths - Thousandths as decimals - Rounding decimals - Order and compare decimals - Understand percentages - Percentages as fractions and decimals - Equivalent F.D.P	- Understand the concept of equivalent fractions - Understand that tenths and hundredths can be written as fractions or as decimals - Know that $^1/_4$ = 0.25, $^1/_2$ = 0.5 and $^3/_4$ = 0.75 Understand the concept of an improper fraction - Add and subtract fractions with the same denominator within and beyond one whole - Recognise and use tenths and hundredths - Understand that per cent relates to number of parts per hundred - Understand that a percentage can be written as a fraction with a denominator of 100 - Write any percentage as a decimal	Fraction Numerator Denominator Improper fraction, Proper fraction, Top-heavy fraction Tenth, hundredth, thousandth Per cent, Percentage Decimal Equivalent **Notation** Diagonal fraction bar / horizontal fraction bar	White Rose Fractions Assessment A https://whiterosemaths.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-2-Year-5-fractions-A.pdf Fractions Assessment B https://whiterosemaths.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-2-Year-5-Fractions-B.pdf Decimals and Percentages Assessment https://whiterosemaths.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-3-Ye

	- 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 - 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 ⅛ ⅖ ⅘ and those fractions with a denominator of a multiple of 10 or 25.				ar-5-Decimals-and-Percentages_Assessment.pdf Decimals Assessment https://whiterosemaths.com/wp-content/uploads/2019/04/2019/04/2019/04/Year-5-Decimals.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 6	**Pupils should be taught to:** - 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	- simplify fractions - fractions on a number line - compare and order (denominators) - compare and order (numerators) - add and subtract fractions - add fractions - subtract fractions - mixed addition and subtraction - multiply fractions by integers - multiply fractions by fractions - divide fractions by integers - four rules with fractions - fractions of an amount - fractions of an amount - find the whole	- Understand the concept of a fraction as a proportion - Understand the concept of equivalent fractions - Understand the concept of fractions, decimals and percentages being equivalent - Know standard fraction / decimal equivalences (e.g. ½ = 0.5, ¼ = 0.25, $^{1}/_{10}$ = 0.1) - Know that a percentage means 'out of 100' - Convert between mixed numbers and improper fractions - Find equivalent fractions	Fraction Improper fraction, Proper fraction,, Top-heavy fraction Percentage Decimal Proportion Simplify Equivalent Lowest terms **Notation** Diagonal fraction bar / horizontal fraction bar	White Rose Fractions Assessment A + and - https://whiterosemaths.com/wp-content/uploads/2018/11/Year-6-Fractions-A-1.pdf Assessment B x and / https://whiterosemaths.com/wp-content/uploads/2018/11/Year-6-Fractions-B.pdf Decimals Assessment https://whiterosemaths.com/wp-content/uploads/2019/01/Primary

	its simplest form [for example, ¼ x ½ = ⅛ - divide proper fractions by whole numbers [for example, ⅓ ÷ 2 = 1/6] - associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, ⅜] - 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 simple fractions, decimals and percentages, including in different contexts.	- fractions to percentages - equivalent F.D.P - order F.D.P - percentage of an amount - percentages - missing values - three decimal places - multiply by 10, 100, 1000 - divide by 10, 100, 1000 - multiply decimals by integers - divide decimals by integers - division to solve problems - decimals and fractions - fractions to decimals	- Add and subtract fractions when one denominator is a multiple of the other - Multiply a proper fraction by a whole number - Use the formal written method of short multiplication - Know the effect of multiplying and dividing by 10 and 100 - Know percentage equivalents of $^{1}/_{2}$, $^{1}/_{4}$, $^{3}/_{4}$, $^{1}/_{5}$, $^{2}/_{5}$, $^{4}/_{5}$		_Spring_Mini_Assessments/Spring-Block-1-Year-6-Decimals_v2.pdf Percentages Assessment https://whiterosemaths.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-2-Year-6-Percentages2.pdf See also mathematical talk section in white rose scheme of learning for key questions.

Threshold Concept: Geometry (Properties of shape)

	Development Matters and National Curriculum Objectives	Sequence of Learning	Essential Prior knowledge for recall	Vocabulary	Key Questions for assessment
Early Years Foundation Stage	**Early Learning Goal** - Shape does not appear as an ELG	**Autumn:** - Exploring Pattern - Circles & Triangles - Shapes with 4 sides - Comparing shapes **Spring** - Building with 3D shapes - Matching 3D shapes - Printing with 3D shapes - Making simple patterns - Exploring more complex patterns **Summer:** - Find and match shapes - Tangrams - Making new shapes with 2 right angled triangles - Making new shapes with squares - Pattern blocks	**Development Matters** **3-4:** - Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides', 'corners'; straight', 'flat', 'round'. Make comparisons between objects relating to size, length, weight and capacity Select shapes appropriately: flat surfaces for building, a triangular prism for a roof etc. Combine shapes to make new ones - an arch, a bigger triangle etc. Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc. Extend and create ABAB patterns – stick, leaf, stick, leaf. Notice and correct an error in a repeating pattern. **4-5:** Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can. Continue, copy and create repeating patterns.	**Exploring patterns, shape and space** shape, pattern flat,curved, straight, round hollow, solid corner, face, side, edge, end sort, make, build, draw **3D shapes** cube, pyramid, sphere, cone **2D shapes** circle, triangle, square, rectangle, star **Patterns and symmetry** size, bigger, larger, smaller symmetrical, pattern, repeating pattern **Position, direction and movement** position, over, under, above, below top, bottom, side, on, in outside, inside, around, in front, behind front, back, before, after,beside, next to opposite, apart, between, middle, edge corner, direction, left, right, up, down forwards, backwards, sideways, across close, far, near,along, through, to, from, towards, away from, movement slide,roll, turn, stretch, bend	Which shape is a…? How many … can we see in the classroom? Shape hunt around the school Build a model using blocks of different shape - can you tell me how many …. you've used?

Year 1	**Pupils should be taught to:** - 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].	- Recognise and name 3D shapes - Sort 3D shapes - Recognise and name 2D shapes - Sort 2D shapes - Patterns with 3D and 2D shapes		**Shape and space** shape, pattern flat,curved, straight, round hollow, solid corner, *point, pointed*, face, side, edge, end sort, make, build, draw **3D shapes** cube, *cuboid*, pyramid, sphere, cone *cylinder* **2D shapes** circle, triangle, square, rectangle, star **Patterns and symmetry** size, bigger, larger, smaller symmetrical, pattern, repeating pattern	See also mathematical talk section in white rose scheme of learning for key questions.
Year 2	**Pupils should be taught to:** - 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.	- Recognise 2D and 3D shapes - Count sides on 2D shapes - Count vertices on 2D shapes - Lines of symmetry - Sort 2D shapes - Make patterns with 2D shapes - Count faces on 3D shapes - Count edges on 3D shapes - Count vertices on 3D shapes - Sort 3D shapes - Make patterns with 3D shapes	- Recognise and name different 2 –D shapes - Find everyday examples of 2-D shapes - Recognise and name different 3 –D shapes - Find everyday examples of 3-D shapes	**Shape and space** shape, pattern flat,curved, straight, round hollow, solid corner, *point, pointed*, face, side, edge, end, *surface* sort, make, build, draw **3D shapes** cube, *cuboid*, pyramid, sphere, cone *cylinder* **2D shapes** circle, circular, triangle, triangular, square, rectangle, rectangular star, pentagon, hexagon, octagon **Patterns and symmetry** size, bigger, larger, smaller symmetrical, pattern, repeating patter line of symmetry fold, match mirror line, reflection	White Rose Properties of Shape Assessment https://whiterosemaths.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-3-Year-2-Properties-of-Shape_Assessment.pdf See also mathematical talk section in white rose scheme of learning for key questions.

Year 3	**Pupils should be taught to:** - 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.	- Turns and angles - Right angles in shapes - Compare angles - Draw accurately - Horizontal and vertical - Parallel and perpendicular - Recognise and describe 2D shapes - Recognise and describe 3D shapes - Make 3D shapes	- Know the names of common 2D shapes - Know the names of cuboids, prisms, spheres, pyramids and cones - Know the meaning of side, edge, vertex (vertices) and face - Use a straightedge to construct lines and shapes - Recognise and name the fractions $^{1}/_{2}$, $^{1}/_{4}$, $^{2}/_{4}$, $^{3}/_{4}$	Horizontal, Vertical, Perpendicular Parallel Face, Edge, Vertex (Vertices) Cube, Cuboid, Prism, Cylinder, Pyramid, Cone, Sphere Quadrilateral, Square, Rectangle, Parallelogram, (Isosceles) Trapezium, Kite, Rhombus, Triangle, Circle Polygon, Hexagon, Pentagon, Octagon, Decagon **Notation** Arrow notation to represent parallel lines Right angle notation for perpendicular lines	White Rose Properties of Shape Assessment https://whiterosemaths.com/wp-content/uploads/2019/05/Year-3-Properties-of-Shape.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 4	**Pupils should be taught to:** - 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 angles - Compare and order angles - Triangles - Quadrilaterals - Lines of symmetry - Complete a symmetric figure	- Reflect a shape in a vertical line of symmetry - Use a ruler to construct a straight line joining two points - Know the names of special quadrilaterals - Understand angles as a measure of turn - Recognise angles in shapes - Identify right angles as a quarter turn	Turn Angle Right angle Acute angle Obtuse angle Greater than, less than **Notation** Right angle notation Arc notation for all other angles	White Rose Properties of Shape Assessment https://whiterosemaths.com/wp-content/uploads/2019/06/Year-4-Block-5_Properties-of-shapes.pdf See also mathematical talk section in white rose scheme of learning for key questions.

Year 5	**Pupils should be taught to:** - 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 360o) angles at a point on a straight line and 2 1 a turn (total 180o) - other multiples of 90o - 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.	- Measuring angles in degrees - Measuring with a protractor - Drawing lines and angles accurately - Calculating angles on a straight line - Calculating angles around a point - Calculating lengths and angles in shapes - Regular and irregular polygons - Reasoning about 3D Shapes	- Identify right angles - Use coordinates in the first quadrant - Understand that an acute angle is less than a right angle - Understand that an obtuse angle is greater than a right angle and less than two right angles - Identify acute angles - Identify obtuse angles - Identify acute, obtuse and right angles in shapes - Compare angles up to two right angles in size - Order angles up to two right angles in size	Turn Angle Degrees Right angle Acute angle Obtuse angle Reflex angle Protractor **Notation** Right angle notation Arc notation for all other angles The degree symbol (°)	White Rose Properties of Shape Assessment https://whiterosemaths.com/wp-content/uploads/2019/04/Year-5-Properties-of-Shape.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 6	**Pupils should be taught to:** - draw 2-D shapes using given dimensions and angle - 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.	- Measure with a protractor - Introduce angles - Calculate angles - Vertically opposite angles - Angles in a triangle - Angles in a triangle - special cases - Angles in a triangle - missing angles - Angles in special quadrilaterals - Angles in regular polygons - Draw shapes accurately - Draw nets of 3D shapes	- Know the names of common 2D shapes - Know the names of common 3D shapes - Use a protractor to measure and draw angles· - Know the properties of rectangles - Know the difference between a regular and an irregular polygon - Add and subtract numbers up to three digits	Protractor. Measure Cube, Cuboid, Cylinder, Pyramid, Prism Net, Edge, Face, Vertex (Vertices) Quadrilateral, Square, Rectangle, Parallelogram, (Isosceles) Trapezium, Kite, Rhombus, Delta, Arrowhead Triangle, Scalene, Right-angled, Isosceles, Equilateral Polygon, Regular, Irregular Pentagon, Hexagon, Octagon, Decagon, Dodecagon Circle, Radius, Diameter, circumference, Centre Parallel, Diagonal Angle **Notation** Dash notation to represent equal lengths in shapes and geometric diagrams Right angle notation	White Rose Assessment Properties of shape https://whiterosemaths.com/wp-content/uploads/2019/04/2019/04/2019/04/Year-6-Properties-of-Shape.pdf See also mathematical talk section in white rose scheme of learning for key questions.

Threshold Concept: Geometry (Describe position, direction and movement)

	Development Matters and National Curriculum Objectives	Sequence of Learning	Essential Prior knowledge for recall	Vocabulary	Key Questions for assessment
Early Years Foundation Stage	**Early Learning Goal:** - Not in the ELGs	**Autumn** - Spatial Awareness Summer - Spatial Reasoning - Visualise and Build - Mapping	**Development Matters** **3-4** Understand position through words alone – for example, "The bag is under the table," – with no pointing. Describe a familiar route. Discuss routes and locations, using words like 'in front of' and 'behind'. **4-5** Select, rotate and manipulate shapes in order to develop spatial reasoning skills.	position over, under above, below top, bottom, side on, in outside, inside around in front, behind front, back beside, next to opposite apart between middle, edge corner direction left, right up, down forwards, backwards, sideways across next to, close, near, far along through to, from, towards, away from movement slide roll turn stretch, bend whole turn, half turn	- Show them a picture/set up a tuff top - which animal is behind the tree? What is in front of the rocks? - PE lesson with large obstacles and child have to move themselves
Year 1	**Pupils should be taught to:** - describe position, direction and movement, including whole, half, quarter and three- quarter turns.	- Describe turns - Describe position	- Describe position using language such as 'behind' or 'next to' - Know the language of half and quarter	position, over, under, *underneath* above, below, top, bottom, side on, in, outside, inside, around, in front, behind, front, back before, after, beside, next to, opposite apart, between middle, edge, *centre*, corner, direction *journey*,left, right,up, down forwards, backwards, sideways across, close, far, near, along, through to, from, towards, away from movement, slide, roll, turn, *whole turn, half turn* stretch, bend	White Rose Position and Direction Assessment https://whiterosemaths.com/resources/assessment/primary-assessment/end-of-block-assessments/ See also mathematical talk section in white rose scheme of learning for key questions.
Year 2	**Pupils should be taught to:** - order and arrange combinations of mathematical objects in patterns and sequences	- Describing movement - Describing turns - Describing movement and turns - Making patterns with shapes	- Describe position using language such as 'behind', 'next to', 'on top of' and 'between'	position, over, under, underneath above, below,top, bottom, side on, in, outside, inside, around, in front, behind, front, back,before, after	White Rose Position and DIrection Assessment https://whiterosemaths.com/wp-content/uploads/2019/04/2019/04/2019/

	- 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 position, direction and movement, including whole, half, quarter and three-quarter turns - Connect moving clockwise with movement on a clock face	beside, next to,,opposite, apart, between middle, edge, centre, corner, direction journey, *route,* left, right, up, down *higher, lower*, forwards, backwards, sideways,across, close, far, near along, through, to, from, towards, away from *clockwise, anti-clockwise* movement, slide,roll, whole turn, half turn, *quarter turn, right angle* *straight line,*stretch, bend	04/Year-2-Position-and-Direction.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 3				Half, Quarter, Three quarters Angle, Turn, Right angle Greater than, less than **Notation** Right angle notation	
Year 4	**Pupils should be taught to:** - 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.	- describe position - draw on a grid - move on a grid - describe a movement on a grid	- Know names and basic properties of polygons - Know the language of movement; left, right, up and down	2-D Grid, Axis, axes, x-axis, y-axis, Origin (First) quadrant, coordinates Point, Translation, Transformation Left, right, up, down **Notation** Coordinates should be separated by a comma and enclosed in brackets (x, y)	White Rose Position and Direction Assessment https://whiterosemaths.com/wp-content/uploads/2019/06/Year-4-Block-6_Position-and-direction.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 5	**Pupils should be taught to:** - 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.	- position in the first quadrant - reflection - reflection with coordinates - translation - translation with coordinates	- Use coordinates in the first quadrant - Describe a translation using mathematical language	2-D Grid, Axis, axes, x-axis, y-axis, Origin (First) quadrant, coordinates Point, Translation, Transformation, Reflection, Transformation Object, Image Congruent, congruence **Notation** coordinates should be separated by a comma and enclosed in brackets (x, y)	White Rose Position and Direction Assessment https://whiterosemaths.com/wp-content/uploads/2019/05/Year-5-Position-and-direction-1.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 6	**Pupils should be taught to:**	- The first quadrant - Four quadrants - Translations	- Use coordinates in the first quadrant - Identify a translation	2-D Grid, Axis, axes, x-axis, y-axis, Origin Four Quadrants, coordinates	White Rose Position and Direction Assessment

	- 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.	- Reflections	- Carry out a translation in the first quadrant - Identify a reflection - Carry out a reflection in the first quadrant using mirror lines parallel to the axes - Know the meaning of 'congruent', 'congruence', 'object', 'image'	Point, Translation, Reflection, Transformation Object, Image Congruent, congruence **Notation** coordinates should be separated by a comma and enclosed in brackets (x, y)	https://whiterosemaths.com/wp-content/uploads/2018/Mini_Assessments_Primary_Autumn/Year-6-Position-and-Direction.pdf See also mathematical talk section in white rose scheme of learning for key questions.

Threshold Concept: Measures (Time, Length, Mass, Capacity, Perimeter, Area, Volume, Converting Units and Money)

	Development Matters and National Curriculum Objectives	Sequence of Learning	Essential Prior knowledge for recall	Vocabulary	Key Questions for assessment
Early Years Foundation Stage	**Early Learning Goal:** - Not within the ELG	**Autumn** - Compare size, mass and capacity - Night & Day/Time **Spring** - Comparing mass - Comparing capacity - Measuring capacity - Measuring ingredients - Comparing length - Comparing height - Days of the week - Measuring height - Measuring time	**Development Matters** **3-4** Make comparisons between objects relating to size, length, weight and capacity Select shapes appropriately: flat surfaces for building, a triangular prism for a roof etc. Combine shapes to make new ones - an arch, a bigger triangle etc. Talk about and identifies the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc. Extend and create ABAB patterns – stick, leaf, stick, leaf. Notice and correct an error in a repeating pattern. Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...' **4-5** Compare length, weight and capacity.	Problems involving 'real life' or money compare double, half, halve pair, count out, share out left, left over money, coin, penny, pence, pound, price, cost, change costs the same as how much…? how many…? total Measures (general) measure, size, compare, guess, estimate enough, not enough, too much, too little, too many, too few nearly, close to, about the same as just over, just under Length length, width, height, depth long, short, tall, high, low wide, narrow, deep, shallow thick, thin, longer, shorter, taller, higher… and so on longest, shortest, tallest, highest… and so on far, near, close Mass weigh, weighs, balances heavy/light, heavier/lighter, heaviest/lightest balance, weight, scales Capacity full, half full, empty, holds,container Time time, *days of the week:* Monday, Tuesday…, day, week birthday, holiday morning, afternoon, evening, night bedtime, dinnertime, playtime today, yesterday, tomorrow	how much…? how many? how many one pence coins do you need to make…? What's the total? Which is the longest etc? Which is the lightest etc? Which bottle is full etc? What day is it today? What day was it yesterday? What time is it? (o'clock) It is phonics now, what happens next?

				before, after, next, last now, soon, early, late quick, quicker, quickest, quickly slow, slower, slowest, slowly old, older, oldest new, newer, newest takes longer, takes less time clock, watch, hands	
Year 1	**Pupils should be taught to:** - 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,	**Length and Height** - Compare lengths and height - Measure length **Weight and Volume** - Introduce weight and mass - Measure mass - Compare mass - Introduce capacity and volume - Measure capacity - Compare capacity **Money** - Recognising coins - Recognising notes - Counting in coins **Time** - Before and after - Dates - Time to the hour - Time to the half hour - Writing time - Comparing time	- Order numbers to 12 - Understand how a number line is organised - Understand the concept of time - Beginning to use everyday language related to money	**Money** money, coin, penny, pence, pound, price, cost, buy, sell, spend, spent pay,change, dear, costs more cheap, costs less, cheaper costs the same as how much…? how many…? total **Measures (general)** measure, size, compare, guess, estimate enough, not enough,too much, too little, too many, too few, nearly, *roughly*, close to, about the same as just over, just under **Length** length, width, height, depth long, short, tall, high, low, wide, narrow,deep, shallow, thick, thin longer, shorter, taller, higher… and so on,longest, shortest, tallest, highest… and so on,far, near, close *metre, ruler, metre stick* **Mass** weigh, weighs, balances heavy/light, heavier/lighter, heaviest/lightest balance, scales, weight **Capacity** full,half full, empty,holds, container **Time** *days of the week:* Monday, Tuesday… *seasons: spring, summer, autumn, winter* day, week, *month, year, weekend,* birthday, holiday morning, afternoon, evening night, *midnight*	White Rose Money Assessment https://whiterosemaths.com/resources/assessment/primary-assessment/end-of-block-assessments/ See also mathematical talk section in white rose scheme of learning for key questions.

	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			bedtime, dinnertime, playtime today, yesterday, tomorrow before, after,next, last now, soon, early, late quick, quicker, quickest, quickly *fast, faster, fastest* slow, slower, slowest, slowly old, older, oldest new, newer, newest takes longer, takes less time hour, o'clock, *half past* clock, watch, hands *how long ago?, how long will it be to…? ,how long will it take to…?* *how often?* *always, never, often, sometimes, usually, once, twice*	
Year 2	**Pupils should be taught to:** - 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** - Count money - pence - Count money - pounds (notes and coins) - Count money (notes and coins) - Select money - Make the same amount - Compare money - Find the total - Find the difference - Find change - Two-step problems **Length and Height** - Measure length - Compare Lengths - Order lengths - Four operations with lengths **Time** - O'clock and half past - Quarter past and quarter to - Telling the time to 5 minutes - Hours and days - Find durations of time - Compare durations of time	- Read the time to the hour and half past - Draw the hands on a clock face to show the time to the hour or half past - Know the meaning of before, after, next, first, today, yesterday, tomorrow, morning, afternoon, evening and o'clock - Use the language long, short, tall, heavy, light, full, empty, more than, less than, double, half - Use a ruler, weighing scale and container to measure length, mass and capacity - Know and use the symbols >, < and = - Add and subtract one- and two-digit numbers to 20 - Recognise the coins: 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2 - Recognise the notes: £5 and £10	**Money** money coin penny, pence, pound, *(£)* price, cost buy, *bought*, sell, *sold* spend, spent pay change dear, costs more cheap, costs less, cheaper how much…? how many…? total **Measures (general)** measure, size compare *measuring scale* guess, estimate enough, not enough too much, too little too many, too few nearly, roughly, about, close to, about the same as just over, just under **Length** length, width, height, depth long, short, tall, high, low wide, narrow, deep, shallow, thick, thin longer, shorter, taller, higher… longest, shortest, tallest, highest… far, further, furthest, near, close metre (*m*), *centimetre (cm)* ruler, metre stick, tape measure **Mass** weigh, weighs, balances heavy/light, heavier/lighter, heaviest/lightest *kilogram (kg), half-kilogram, gram(g)*	White Rose Money Assessment https://whiterosemaths.com/wp-content/uploads/2018/10/Mini-Assessment-Block-3_Year-2-Money.pdf Length and Height Assessment https://whiterosemaths.com/wp-content/uploads/2019/03/Primary_Mini_Assessments/Spring-Block-5-Mini-Assessment-Year-2-Length-and-Height.pdf Time Assessment https://whiterosemaths.com/wp-content/uploads/2019/05/Year-2-Time.pdf Measurement Assessment https://whiterosemaths.com/wp-content/uploads/2019/06/Year-2-Measurement-1.pdf See also mathematical talk section in white rose

	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.			balance, scales, weight **Capacity** *capacity* full, half full empty holds, *contains litre (l), half-litre, millilitre (ml)* container **Time** time *days of the week:* Monday, Tuesday… *months of the year: January, February…seasons:* spring, summer, autumn, winter day, week, *fortnight*, month, year weekend birthday, holiday morning, afternoon, evening, night, midnight bedtime, dinnertime, playtime today, yesterday, tomorrow before, after next, last now, soon, early, late quick, quicker, quickest, quickly fast, faster, fastest slow, slower, slowest, slowly old, older, oldest new, newer, newest takes longer, takes less time how long ago?/how long will it be to…? how long will it take to…? hour, *minute, second* o'clock, half past, *quarter to, quarter past* clock, watch, hands *digital/analogue clock/watch, timer* how often? always, never, often, sometimes, usually once, twice	scheme of learning for key questions.
Year 3	**Pupils should be taught to:** - 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,	**Money** - Pounds and pence - Convert pounds and pence - Add money - Subtract money - Give change **Length & Perimeter** - Measure length - Equivalent lengths m & cm - Equivalent lengths mm & sm - Compare lengths - Add lengths - Subtract lengths	- Know the number of minutes in an hour, hours in a day, and days in a week - Tell and write the time to the nearest five minutes - Measure length using m, cm - Measure mass using kg, g - Measure volume / capacity using l, ml - Recognise the coins: 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2	Analogue 12-hour 24-hour o'clock Morning Afternoon Noon, Midnight Second, Minute, Hour Day, Week, Month Year Leap year Roman Numeral **Notation** The Roman numeral for 4 is IV. It is the only exception to the rules of Roman numerals as it is sometimes written IIII on a clock or watch Using a.m. and p.m. for 12-hour clock notation	White Rose Money Assessment https://whiterosemaths.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-2-Year-3-Money.pdf Length and Perimeter Assessment https://whiterosemaths.com/wp-content/uploads/2019/02/Primary_Spring_

	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].	- Measure perimeter - Calculate perimeter **Time** - Months and years - Hours in a day - Telling the time to 5 minutes - Telling the time to the minute - Using am and pm - 24 hour clock - Finding the durations - Comparing durations - Start and end times - Measuring time in seconds **Mass & Capacity** - Measure mass - Compare mass - Add and subtract mass - Measure capacity - Compare capacity - Add and subtract capacity	- Read and say amounts of money using the coins 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2 - Count, say and record amounts of money using the coins 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2 - Recognise the notes: £5 and £10 - Recognise the symbols for pounds (£) and pence (p) - Record amounts of money using either pounds (£) or pence (p) - Find different combinations of coins that equal the same amounts of money - Solve simple problems involving money, including giving change	Length, distance, Mass Volume Capacity Metre, centimetre, millimetre Kilogram, gram Litre, millilitre Perimeter 2-D **Notation** Abbreviations of units in the metric system: m, cm, mm, kg, g, l, ml Money Coin Change Note **Notation** Pounds (£) Pence (p)	Mini_Assessments/Spring-Block-4-Mini-Assessment-Year-3-Length-and-Perimeter.pdf Time Assessment https://whiterosemaths.com/wp-content/uploads/2019/04/Year-3-Time.pdf Measures Assessment https://whiterosemaths.com/wp-content/uploads/2019/06/Year-3-Measurement.pdf

Year 4	**Pupils should be taught to:** - 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.	- Kilometers - Perimeter on a grid - Perimeter of a rectangle - Perimeter of a rectilinear shapes - Hours, minutes and seconds - Years, months, weeks and days - Analogue to digital - 12 hour - Analogue to digital - 24 hour - Pounds and pence - Ordering money - Estimating money - Four operations	- Use a ruler to measure lengths to the nearest millimetre - Use digital and mechanical scales to measure mass - Use measuring vessels to measure a volume of liquid - Choose appropriate units to state the result of a measurement - Compare the length (mass, volume, capacity) of two or more objects - Solve measurement problems involving addition or subtraction - Find the perimeter of a simple 2D shape by measuring - Use analogue and digital 12-hour clocks - Know the number of seconds in a minute, minutes in an hour, hours in a day, and the number of days in each week, month, year and leap year - Know the value of all British coins and notes - Know the number of pence in a pound - Calculate the duration of time for a given event or task	Analogue Digital 12-hour 24-hour Second, Minute, Hour Day, Week, Month, Year Pound (£) Pence (p) Length Mass Volume **Notation** £ and p 12-hour and24-hour notation use a ':', for example 18:40 and 9:30 a.m. Length, distance Mass Volume Capacity Metre, centimetre, millimetre Kilogram, gram Litre, millilitre Hour, minute, second Decimal **Notation** Abbreviations of units in the metric system: m, cm, mm, kg, g, l, ml Perimeter Area Dimensions Square Rectangle Rectilinear Polygon Millimetre, Centimetre, Metre, Kilometre **Notation** Abbreviations of units in the metric system: km, m, cm, mm	White Rose Length and Perimeter Assessment https://whiterosemaths.com/wp-content/uploads/2018/10/Mini-Assessment-Block-3_Year-4-Length-and-Perimeter.pdf Spring Area Assessment https://whiterosemaths.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-2-Year-4-Area.pdf Summer Money Assessment https://whiterosemaths.com/wp-content/uploads/2019/04/Year-4-Money.pdf Summer Time Assessmenthttps://whiterosemaths.com/wp-content/uploads/2019/05/Year-4-Time.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 5	**Pupils should be taught to:** - 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	- Kilograms and kilometers - Milligrams and millimeters - Metric units - Imperial units - Converting units of time - Timetables - What is volume? - Compare volume - Estimate volume - Estimate capacity - Measure perimeter - Calculate perimeter - Area of rectangles - Area of compound shapes - Area of irregular shapes	- Convert between kilometres and metres, centimetres and millimetres - Convert between litres and millilitres - Convert between hours and minutes, minutes and seconds - Use decimal notation to two decimal places when converting between measures	Length, distance Mass, weight Volume Capacity Metre, centimetre, millimetre Kilogram, gram Litre, millilitre Hour, minute, second Inch, foot, yard Pound, ounce Pint, gallon **Notation** Abbreviations of units in the metric system: m, cm, mm, kg, g, l, ml	White Rose Area and Perimeter Assessment https://whiterosemaths.com/wp-content/uploads/2018/Mini_Assessments_Primary_Autumn/Year-5-Area-and-Perimeter.pdf Volume Assessment https://whiterosemaths.com/wp-content/uploads/2019/06/Year-5-Block-5_Volume.pdf Converting Units Assessment https://whiterosemaths.com/wp-content/uploads/

	- 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.			Abbreviations of units in the Imperial system: lb, oz Perimeter Area Volume Capacity Dimensions Square, rectangle Composite rectilinear Polygon Cube, cuboid Millimetre, Centimetre, Metre, Kilometre Square centimetre, square metre Cubic centimetre, centimetre cube Square unit **Notation** Abbreviations of units in the metric system: km, m, cm, mm, cm^2, m^2, cm^3	2019/06/Year-5-Converting-Units-1.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 6	**Pupils should be taught to:** - 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	- metric measures - convert metric measures - calculate metric measures - miles and kilometers - imperial measures - shapes - same area - area and perimeter - area of a triangle - area of a parallelogram - volume - counting cubes - volume of a cuboid	- Know the meaning of perimeter (area, volume, capacity) - Know that the area of a rectangle is given by the formula area = length × width - Know that area can be measured using square centimetres or square metres, and the abbreviations cm^2 and m^2 - Know that volume is measured in cubes - Convert between adjacent metric units of length, mass and capacity - Know rough equivalents between inches and cm, feet and cm, kg and lb, pint and ml	Length, distance Mass, weight Volume Capacity Metre, centimetre, millimetre Tonne, kilogram, gram, milligram Litre, millilitre Hour, minute, second Inch, foot, yard Pound, ounce Pint, gallon **Notation** Abbreviations of units in the metric system: m, cm, mm, kg, g, l, ml Abbreviations of units in the Imperial system: lb, oz Perimeter, area, volume, capacity	White Rose Converting Measures Assessment https://whiterosemaths.com/wp-content/uploads/2019/02/Primary_Spring_Mini_Assessments/Spring-Block-4-Mini-Assessment-Year-6-Converting-Measures.pdf Perimeter, Area and Volume Assessment https://whiterosemaths.com/wp-content/uploads/2019/03/Primary_Mini_Assessments/Spring-Block-5-Mini-Assessment-Year-6

	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].		- Use decimal notation to two decimal places when converting between metric unit	Square, rectangle, parallelogram, triangle Composite rectilinear Polygon Cube, cuboid Millimetre, Centimetre, Metre, Kilometre Square millimetre, square centimetre, square metre, square kilometre Cubic centimetre, centimetre cube Formula, formulae Convert Length, breadth, depth, height, width **Notation** Abbreviations of units in the metric system: km, m, cm, mm, mm^2, cm^2, m^2, km^2, mm^3, cm^3, km^3	-Perimeter-Area-and-Volume.pdf See also mathematical talk section in white rose scheme of learning for key questions.

Threshold Concept: Use statistics

	National Curriculum Objectives	Sequence of Learning	Essential Prior knowledge for recall	Vocabulary	Key Questions for assessment
Year 1				Organising and using data count, sort, *vote* list, group, set *table*	
Year 2	**Pupils should be taught to:** - 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.	- Make tally charts - Draw pictograms (1-1) - Interpret pictograms(1-1) - Draw pictograms(2, 5 and 10) - Interpret pictograms (2,5 and 10) - Block diagrams	- Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number - Compare the value of numbers - Order numbers	Count, tally, sort, vote, graph, block graph, pictogram, represent, group, set, list, table, label, title, most popular, most common, least popular, least common	White Rose Statistics Assessment https://whiterosemaths.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-2-Year-2-Statistics.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 3	**Pupils should be taught to:** - 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.	- Pictograms - Bar charts - Tables	- Interpret and construct block diagrams - Interpret and construct pictograms where the symbol represents a single item or 2,5 and 10 units. - Interpret and construct simple tables - Understand tallying	Data, Pictogram Symbol Key Tally Bar chart Table Total Compare Axis **Notation** When tallying, groups of five are created by striking through each group of four	White Rose Statistics Assessment https://whiterosemaths.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-3-Year-3-Statistics_Assessment.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 4	**Pupils should be taught to:** - interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.	- interpret charts - comparison, sum and difference - introducing line graphs - line graphs	- Interpret and construct a pictogram where the symbol represents multiple items - Interpret and construct a simple bar chart where one centimetre represents 2, 5 or 10 items - Interpret and construct tables of data	Data Pictogram Symbol Key Tally Bar chart Time graph Scale Axis Graph Frequency	White Rose Statistics Assessment https://whiterosemaths.com/wp-content/uploads/2019/06/Year-4-Statistics.pdf See also mathematical talk section in white rose

	- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.				scheme of learning for key questions.
Year 5	**Pupils should be taught to:** - solve comparison, sum and difference problems using information presented in a line graph - complete, read and interpret information in tables, including timetables.	- Read and interpret line graphs - Draw line graphs - Use line graphs to solve problems - Read and interpret tables - Two-way tables - Timetables	- Interpret and construct a simple bar chart	Data Scale Axis Graph Frequency Time graph, Time series Line graph Bar-line graph, vertical line chart Maximum, minimum	White Rose Statistics Assessment https://whiterosemaths.com/wp-content/uploads/2018/10/Mini-Assessment-Block-3_Year-5-Statistics.pdf See also mathematical talk section in white rose scheme of learning for key questions.
Year 6	**Pupils should be taught to:** - interpret and construct pie charts and line graphs and use these to solve problems - calculate and interpret the mean as an average.	- read and interpret line graphs - draw line graphs - use line graphs to solve problems - circles - read and interpret pie charts - pie charts with percentages - draw pie chart - the mean	- Measure and construct angles using a protractor - Interpret and construct a simple line graph - Approximate a number by rounding to a given number of decimal places	Data Scale Axis, axes Graph Frequency Time graph, Time series Line graph Pie chart Sector Angle Protractor Degrees Maximum, minimum Average Mean Measure Data Statistic Statistics Approximate Round	White Rose Statistics Assessment https://whiterosemaths.com/wp-content/uploads/2019/05/Year-6-Statistics.pdf See also mathematical talk section in white rose scheme of learning for key questions.

Threshold Concept: Use algebra (Year 6 only)

	Development Matters and NC Objectives	Sequence of Learning	Essential Prior knowledge for recall	Vocabulary	Key Questions for assessment
Year 6	**Pupils should be taught to:** - 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.	- find a rule - one step - find a rule - two step - forming expressions - substitution - formulae - forming equations - solve simple one-step equations - solve two-step equations - find pairs of values - enumerate possibilities	- Know the order of operations - Know the fact that area of rectangle = length × width - Use symbols to represent variables in a formula	Algebra, algebraic, algebraically Symbol Expression Variable Substitute Equation Unknown Enumerate Pattern Sequence Linear Term Ascending Descending **Notation** The lower case and upper case of a letter should not be used interchangeably when worked with algebra Juxtaposition is used in place of '×'. 2*a* is used rather than *a*2. Division is written as a fraction Formula, Formulae Expression Variable Substitute Symbol Mile Kilometre Metric Imperial **Notation** When written algebraically a formula should not include any units.	White Rose Algebra Assessment https://whiterosemaths.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-3-Year-6-Algebra_Assessment.pdf See also mathematical talk section in white rose scheme of learning for key questions.

Threshold Concept: Ratio and proportion (Y6 only)

	NC Objectives	Sequence of Learning	Essential Prior knowledge for recall	Vocabulary	Key Questions for assessment
Year 6	**Pupils should be taught to:** - 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.	- Using ratio language - Ratio and fractions - Introducing the ratio symbol - Calculating ratio - Using scale factors - Calculating scale factors - Ratio and proportion problems	- Recall multiplication facts for multiplication tables up to 12 × 12 - Recall division facts for multiplication tables up to 12 × 12 - Find fractions of an amount - Find multiples of a given number	Proportion Quantity Integer Similar (shapes) Enlargement Scale factor Group Share Multiples	White Rose Ratio Assessment - https://whiterosemaths.com/wp-content/uploads/2019/03/Primary_Mini_Assessments/Spring-Block-6-Mini-Assessment-Year-6-Ratio.pdf See also mathematical talk section in white rose scheme of learning for key questions