FOUR MARKS CE PRIMARY SCHOOL

MATHS CURRICULUM MAP

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MATHS: Early Years

Mathematical language

- To build up vocabulary that reflects the breadth of their experiences.
- To extend vocabulary, especially by grouping and naming, exploring the meaning and sounds of new words.

Statutory framework for the early years foundation stage

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes

Early Learning Goals

Number

Children at the expected level of development will:
- Have a deep understanding of number 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

Children at the expected level of development will:
- 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.

Cardinality and Counting

- Children need to know number names, initially to five, then then, and extending to larger numbers, including crossing boundaries 19/20 and 29/30. Counting forwards and backwards, and starting from different numbers.
- Tagging each object with one number word. Lots of opportunities to count things in irregular arrangements, different sizes, counting things that cannot be seen (e.g. actions) and cannot be manipulated (e.g. pictures on a screen).
- Cardinality- knowing the last number denotes the total amount of objects counted.
- Subitising- recognising small quantities without the need to count them all, both in regular and irregular arrangements.
- Numeral meanings- the opportunity to match the number shape to quantities and amounts in different context
- Conservation- knowing the total amount doesn't change if the objects are rearranged, if none are added or removed.

Comparison

- More than/ Less than
- Identifying groups with the same number of things- checking groups are equal- by matching objects on a one to one basis.
- Comparing numbers and reasoning
- Knowing the 'one more than/one less than' relationship between counting numbers

Composition

- Part/whole- identifying smaller numbers within a larger number
- Making 'number arrangements' that show the same number represented in lots of different ways.
- Inverse operations- having a number of opportunities to partition a number of things into two groups, and two recognise that these two groups can be combined to give the same total.
- A number can be partitioned into different pairs of numbers, more than two numbers
- Number bonds- knowing which pairs combine to make a given number

Early Years Foundation Stage

Please note that the Foundation Stage Curriculum is separate to the National Curriculum which starts in Year 1.
However, the Foundation Stage curriculum plays an important part in securing foundation skills in National Curriculum subjects.

Maths: Number
NC links: Maths

As a school, we follow the NCETM Maths Mastery Scheme.

EYFS skill progression in Number:

Subitising:

Children will:	Children will:	Children will:	Children will:	Children will:
• perceptually subitise within 3 • identify sub-groups in larger arrangements • create their own patterns for numbers within 4 • practise using their fingers to represent quantities which they can subitise • experience subitising in a range of contexts, including temporal patterns made by sounds.	• continue from first half-term • subitise within 5, perceptually and conceptually, depending on the arrangements.	• increase confidence in subitising by continuing to explore patterns within 5, including structured and random arrangements • explore a range of patterns made by some numbers greater than 5, including structured patterns in which 5 is a clear part • experience patterns which show a small group and '1 more' • continue to match arrangements to finger patterns.	• explore symmetrical patterns, in which each side is a familiar pattern, linking this to 'doubles'.	• continue to practise increasingly familiar subitising arrangements, including those which expose '1 more' or 'doubles' patterns • use subitising skills to enable them to identify when patterns show the same number but in a different arrangement, or when patterns are similar but have a different number • subitise structured and unstructured patterns, including those which show numbers within 10, in relation to 5 and 10 be encouraged to identify when it is appropriate to count and when groups can be subitised

Number (ELG)
Children will:

- 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.
- Automatically recall number bonds for numbers 0–5 and some to 10.

Cardinality, ordinality and counting:

Children willL	Children will:	Children will:	Children will:	Children will:
• relate the counting sequence to cardinality, seeing that the last number spoken gives the number in the entire set • have a wide range of opportunities to develop their knowledge of the counting sequence, including through rhyme and song • have a wide range of opportunities to develop 1:1 correspondence, including by coordinating movement and counting • have opportunities to develop an understanding that anything can be counted, including actions and sounds • explore a range of strategies which support accurate counting.	• continue to develop their counting skills • explore the cardinality of 5, linking this to dice patterns and 5 fingers on 1 hand • begin to count beyond 5 • begin to recognise numerals, relating these to quantities they can subitise and count.	• continue to develop verbal counting to 20 and beyond • continue to develop object counting skills, using a range of strategies to develop accuracy • continue to link counting to cardinality, including using their fingers to represent quantities between 5 and 10 • order numbers, linking cardinal and ordinal representations of number.	• continue to consolidate their understanding of cardinality, working with larger numbers within 10 • become more familiar with the counting pattern beyond 20.	• continue to develop verbal counting to 20 and beyond, including counting from different starting numbers • continue to develop confidence and accuracy in both verbal and object counting.

Composition

ELG: Numerical Patterns

Children will:

- Verbally count beyond 20, recognising the pattern of the counting systems.
- 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.

	Children will: • see that all numbers can be made of 1s • compose their own collections within 4.	Children will: • explore the concept of 'wholes' and 'parts' by looking at a range of objects that are composed of parts, some of which can be taken apart and some of which cannot • explore the composition of numbers within 5.	Children will: • continue to explore the composition of 5 and practise recalling 'missing' or 'hidden' parts for 5 • explore the composition of 6, linking this to familiar patterns, including symmetrical patterns • begin to see that numbers within 10 can be composed of '5 and a bit'.	Children will: • explore the composition of odd and even numbers, looking at the 'shape' of these numbers • begin to link even numbers to doubles • begin to explore the composition of numbers within 10.	Children will: • explore the composition of 10.	
	Comparison					
	Children will: • understand that sets can be compared according to a range of attributes, including by their numerosity • use the language of comparison, including 'more than' and 'fewer than' • compare sets 'just by looking'.	Children will: • compare sets using a variety of strategies, including 'just by looking', by subitising and by matching • compare sets by matching, seeing that when every object in a set can be matched to one in the other set, they contain the same number and are equal amounts.	Children will: • continue to compare sets using the language of comparison, and play games which involve comparing sets • continue to compare sets by matching, identifying when sets are equal • explore ways of making unequal sets equal.	Children will: • compare numbers, reasoning about which is more, using both an understanding of the 'howmanyness' of a number, and its position in the number system.	Children will: order sets of objects, linking this to their understanding of the ordinal number system.	

Maths: Shape, Space and Measure NC links: Maths	**Shape, Space and Measure** Children will: • 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'. • 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'. • 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. Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...'	**Shape, Space and Measure** Children will: • Select, rotate and manipulate shapes to develop spatial reasoning skills. • 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. • Compare length, weight and capacity.	**Shape, Space and Measure** .B: There is no longer a national requirement to record summative end of year assessments in Shape, Space and Measure. Children will: Continue to consolidate their knowledge, understanding and application of shape, position, direction, measure and pattern; namely through everyday experiences and continuous provision opportunities.

Four Marks CE Primary School Maths Curriculum

At Key Stage 1 the Programmes of study

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools]. At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Key Stage 1: Years 1&2 NC Statutory Guidance

Year 1

Number and Place value

- 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

Addition and Subtraction

- read and write numbers from 1 to 20 in numerals and words.
- 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.

Multiplication and Division

- 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.

Fractions

- 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.

Measurement

- compare, describe and solve practical problems for:
- lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]
- mass/weight [for example, heavy/light, heavier than, lighter than]
- capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]
- time [for example, quicker, slower, earlier, later]
- measure and begin to record the following:
- lengths and heights mass/weight/capacity and volume
- time (hours, minutes, seconds)
- recognise and know the value of different denominations of coins and notes
- sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
- recognise and use language relating to dates, including days of the week, weeks, months and years
- tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.

Geometry

- 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].
- describe position, direction and movement, including whole, half, quarter and three-quarter turns.

Year 2

Number and Place Value

- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward
- recognise the place value of each digit in a two-digit number (tens, ones)
- identify, represent and estimate numbers using different representations, including the number line
- compare and order numbers from 0 up to 100; use and = signs
- read and write numbers to at least 100 in numerals and in words
- use place value and number facts to solve problems.

Addition and Subtraction

- solve problems with addition and subtraction:
- using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying their increasing knowledge of mental and written methods recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers
- adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Multiplication and Division

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Measurement

- choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels
- compare and order lengths, mass, volume/capacity and record the results using >, < and =
- recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value
- find different combinations of coins that equal the same amounts of money
- solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change

	• compare and sequence intervals of time • tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times • know the number of minutes in an hour and the number of hours in a day **Geometry** • 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. • order and arrange combinations of mathematical objects in patterns and sequences • use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise)

Four Marks CE Primary School Maths Curriculum

CYCLE A			CYCLE B		
Autumn	Spring	Summer	Autumn	Spring	Summer
Up, Up and Away	**Doctor Doctor!**:	**There's no place like home.**	**Fire, Fire! Where in the UK is Barnaby Bear?**	**Journeys into the Unknown**	**All around us.**
Mathematical vocabulary					
Year 1 To read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at year 1. **Year 2** To read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.					
NCTEM Big ideas					
Number: Place Value **Year 1** •The position a digit is placed in a number determines its value. •The language used to name numbers does not always expose the place value, for example the word 'twelve' does not make it transparent that the value of this number is ten and two. It is important that children develop secure understanding of the value of each digit. •Place value is based on unitising: treating a group of things as one 'unit'. In mathematics, units can be any size, for example units of 1, 2, 5 and 10 are used in money. •In place value units of 1, 10 and 100 are used. **Year 2** •The position (place) of a digit in a number determines its value. Hence the term place value. **Addition and Subtraction** **Year 1** •Relating numbers to 5 and 10 helps develop knowledge of the number bonds within 20. For example, given 8 + 7, thinking of 7 as 2 + 5 and adding the 2 to 8 to make 10 and then the 5 to total 15. •Thinking of part whole relationships is helpful in linking addition and subtraction. For example, where the whole is 6, and 4 and 2 are parts. This means that 4 and 2 together form the whole,	**Multiplication and Division** **Year 1** •Counting in steps of equal sizes is based on the big idea of 'unitising' ; treating a group of, say, five objects as one unit of five. •Working with arrays helps pupils to become aware of the commutative property of multiplication, that 2 × 5 is equivalent to 5 × 2. **Year2** •It is important that pupils both commit multiplication facts to memory and also develop an understanding of conceptual relationships. This will aid them in using known facts to work out unknown facts and in solving problems. •Pupils should look for and recognise patterns within tables and connections between them (e.g. 5× is half of 10×). •Pupils should recognise multiplication and division as inverse operations and use this knowledge to solve problems. They should also recognise division as both grouping and sharing. •The recognition of pattern in multiplication helps pupils commit facts to memory, for example doubling twice is the same as multiplying by four, or halving a multiple of ten gives you the related multiple of five.	**Fractions** **Year 1** •Fractions express a relationship between a whole and equal parts of the whole. Ensure children express this relationship when talking about fractions. For example, 'If the circle (where the circle is divided into four equal parts with one part shaded) is the whole, one part is one quarter of the whole circle.' •Halving involves partitioning an object, shape or quantity into two equal parts. •The two parts need to be equivalent in, for example, area, mass or quantity. **Year 2** •Fractions involve a relationship between a whole and parts of a whole. Ensure children express this relationship when talking about fractions. For example, 'If the bag of 12 sweets is the whole, then 4 sweets are one third of the whole.' •Partitioning or 'fair share' problems when each share is less than one gives rise to fractions. •Measuring where the unit is longer than the item being measured gives rise to fractions. **Geometry** **Year 1** •It is important for children to be familiar with a range of 2-D and 3-D shapes and not just recognise them in specific orientations, e.g. thinking that this is a triangle but this or this are not.	**Number: Place Value** **Year 1** •The position a digit is placed in a number determines its value. •The language used to name numbers does not always expose the place value, for example the word 'twelve' does not make it transparent that the value of this number is ten and two. It is important that children develop secure understanding of the value of each digit. •Place value is based on unitising: treating a group of things as one 'unit'. In mathematics, units can be any size, for example units of 1, 2, 5 and 10 are used in money. •In place value units of 1, 10 and 100 are used. **Year 2** •The position (place) of a digit in a number determines its value. Hence the term place value. **Addition and Subtraction** **Year 1** •Relating numbers to 5 and 10 helps develop knowledge of the number bonds within 20. For example, given 8 + 7, thinking of 7 as 2 + 5 and adding the 2 to 8 to make 10 and then the 5 to total 15. •Thinking of part whole relationships is helpful in linking addition and subtraction. For example, where the whole is 6, and 4 and 2 are parts. This means that 4 and 2 together form the whole, which is 6 and 6 subtract 4 leaves the 2 and 6 subtract 2 leaves the 4.	**Multiplication and Division** **Year 1** •Counting in steps of equal sizes is based on the big idea of 'unitising' ; treating a group of, say, five objects as one unit of five. •Working with arrays helps pupils to become aware of the commutative property of multiplication, that 2 × 5 is equivalent to 5 × 2. **Year2** •It is important that pupils both commit multiplication facts to memory and also develop an understanding of conceptual relationships. This will aid them in using known facts to work out unknown facts and in solving problems. •Pupils should look for and recognise patterns within tables and connections between them (e.g. 5× is half of 10×). •Pupils should recognise multiplication and division as inverse operations and use this knowledge to solve problems. 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which is 6 and 6 subtract 4 leaves the 2 and 6 subtract 2 leaves the 4.

Year 2

•Understanding that addition of two or more numbers can be done in any order is important to support children's fluency. When adding two numbers it can be more efficient to put the larger number first. For example, given 3 + 8 it is easier to calculate 8 + 3.

•When adding three or more numbers it is helpful to look for pairs of numbers that are easy to add. For example, given 5 + 8 + 2 it is easier to add 8 + 2 first than to begin with 5 + 8.

•Understanding the importance of the equals sign meaning 'equivalent to' (i.e. that 6 + 4 = 10, 10 = 6 + 4 and 5 + 5 = 6 + 4 are all valid uses of the equals sign) is crucial for later work in algebra. Empty box problems can support the development of this key idea. Correct use of the equals sign should be reinforced at all times. Altering where the equals sign is placed develops fluency and flexibility.

•It is preferable to introduce 3-D shapes before 2-D shapes, since2-D shapes only exist in the real world as faces of 3-D shapes.

•An emphasis should be placed upon identifying and describing the properties of shapes. It is important that pupils develop the correct mathematical language to do so.

•The development of precise language to describe position and movement is important.

•It is not uncommon for pupils to say that this is a square and this is not, or that something like this is a triangle

Year 2

•It is important for pupils to know what the properties are that make up certain shapes, and for them not to just learn the names of typical proto looking shapes.

•It is helpful to think about non examples of shapes. For example, why this is not a triangle:

•Recognising pattern and generalising structures and relationships are key elements for laying the foundations for later work in algebra.

Measurement

Year 1

•Measurement is about comparison, for example measuring to find out which rope is the longest.

•Measurement is about equivalence, for example how many cubes are equivalent to the length of the table or the mass of the teddy?

•Standard units can initially be introduced through using a unit that is greater than the things being compared, for example comparing the capacity of a cup and a carton by filling each and pouring into matching bottles to compare the two.

•Measuring is a practical activity and the activities below should be conducted in practical contexts, using real materials.

Year 2

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Year 2

		•We need standard units of measure in order to compare things more accurately and consistently.			•We need standard units of measure in order to compare things more accurately and consistently.

NCTEM Planning link to White Rose planning topics

Number: Place Value Number: 1.1 Comparison of quantities and measures. 1.2 Introducing 'whole' and parts: part –part whole 1.3 Composition of numbers 0-5 1.4 Composition of numbers:6-10 1.5 Composition of numbers 20 100 1.6 Composition of numbers 11-19 **Number:Addition and subtraction** 1.7 introduction to aggregation and partitioning 1.8 Composition of numbers: multiples of 10 to 100 1.9 Composition of numbers:20-100 1.10 Composition of numbers: 11-19 1.11 Addition and subtraction; bridging 10 1.12 Subtraction as difference 1.13 Addition and subtraction: two-digit and single digit numbers 1.14 Addition and subtraction; two-digit numbers and multiples of ten 1.15 Addition :two digit and two digit numbers 1.16 Subtraction: two digit and to digit number	**Number;** 2.1 Counting, unitising and coins 2.2 Structures: multiplication representing equal groups 2.3 Times tables: groups of 2 and commutativity (part1) 2.4 Times tables: groups of 10 and of 5:and factors of 0 or 1 2.5 Commutativity (part2), doubling and halving 2.6 Structures: quotitive and partitive division	**Fractions;** *It is suggested that all Key Stage 1 fractions content is taught in year 2.* *Cover the KS1 statutory guidance for fractions, including recognising, finding, naming and writing one-quarter, one-third, one-half/two-quarters, and three-quarter of an object, shape or quantity.* 1 Name the fractions 'one-half', 'one-quarter' and 'one-third' in relation to a fraction of a length , shape or set of objects. 2 read and write the fraction notation ½,1/3 and ¼, and relate this to a fraction of a length, shape or set of objects. 3 Find half of a number 4 Find 1/3 or ¼ of a number 5 Find 2/4 and ¾ of an object, shape, set of objects, length or quantity; recognise the equivalence of 2/4 and ½ .	**Number: Place Value Number:** 5.1 Comparison of quantities and measures. 5.2 Introducing 'whole' and parts: part –part whole 5.3 Composition of numbers 0-5 5.4 Composition of numbers:6-10 5.5 Composition of numbers 20 100 5.6 Composition of numbers 11-19 **Number:Addition and subtraction** 5.7 introduction to aggregation and partitioning 5.8 Composition of numbers: multiples of 10 to 100 5.9 Composition of numbers:20-100 5.10 Composition of numbers: 11-19 5.11 Addition and subtraction; bridging 10 5.12 Subtraction as difference 5.13 Addition and subtraction: two-digit and single digit numbers 5.14 Addition and subtraction; two-digit numbers and multiples of ten 5.15 Addition :two digit and two digit numbers 5.16 Subtraction: two digit and to digit number	**Number;** 2.1 Counting, unitising and coins 2.2 Structures: multiplication representing equal groups 2.3 Times tables: groups of 2 and commutativity (part1) 2.4 Times tables: groups of 10 and of 5:and factors of 0 or 1 2.5 Commutativity (part2), doubling and halving 2.6 Structures: quotitive and partitive division	**Fractions;** *It is suggested that all Key Stage 1 fractions content is taught in year 2.* *Cover the KS1 statutory guidance for fractions, including recognising, finding, naming and writing one-quarter, one-third, one-half/two-quarters, and three-quarter of an object, shape or quantity.* 1 Name the fractions 'one-half', 'one-quarter' and 'one-third' in relation to a fraction of a length , shape or set of objects. 2 read and write the fraction notation ½,1/3 and ¼, and relate this to a fraction of a length, shape or set of objects. 3 Find half of a number 4 Find 1/3 or ¼ of a number 5 Find 2/4 and ¾ of an object, shape, set of objects, length or quantity; recognise the equivalence of 2/4 and ½ .

Lets think Maths

Seeing numbers	From a story to a sum	Groups in a crowd	Measuring shoes	Down my Street	Footsteps	Hidden treasure	Broken rulers	Feeding fish	Giants palace	My room	Money-go-round

Key Stage 2 the Programmes of study focus on

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.
By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.
Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

Key Stage 2: Years 3&4 NC Statutory Guidance

Year 3

Number
- count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- compare and order numbers up to 1000
- identify, represent and estimate numbers using different representations
- read and write numbers up to 1000 in numerals and in words
- solve number problems and practical problems involving these ideas.

Addition and Subtraction
- 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.

Multiplication and Division
- 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.

Fractions
- 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, 7 5+ 71 = 76]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.

Year 4

Number- place value
- 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.

Addition and Subtraction
- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Multiplication and Division
- recall multiplication and division facts for multiplication tables up to 12 × 12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Fractions (including decimals)
- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundredths
- recognise and write decimal equivalents to ¼ , ½ , ¾

Measurement

- measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
- measure the perimeter of simple 2-D shapes
- add and subtract amounts of money to give change, using both £ and p in practical contexts
- tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks
- estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- know the number of seconds in a minute and the number of days in each month, year and leap year
- compare durations of events [for example to calculate the time taken by particular events or tasks].

Properties of shape

- 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.

Statistics

- 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.

- 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.

Measurement

- 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

Geometry

- 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.
- 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.

Statistics

- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

Key Stage 2: Years 3 &4					
CYCLE A			CYCLE B		
Autumn	Spring	Summer	Autumn	Spring	Summer
Full Steam Ahead	Angry Earth	It's Chocolate!	Where do we come from?	The Source of Life- Egypt	River Deep & Mountain High
Mathematical language					
Year 3 To read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling. **Year 4** To read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.					
NCTEM big ideas (link to National Curriculum)					
Number: Place Value **Year 3** •The value of a digit is determined by its position in a number. •Place value is based on unitising, treating a group of things as one 'unit'. This generalises to 3 units + 2 units = 5 units (where the units are the same size). **Year 4** •Imagining the position of numbers on a horizontal number line helps us to order them: the number to the right on a number line is the larger number. So 5 is greater than 4, as 5 is to the right of 4. But –4 is greater than –5 as –4 is to the right of –5. •Rounding numbers in context may mean rounding up or down. Buying packets of ten cakes, we might round up to the nearest ten to make sure everyone gets a cake. •Estimating the number of chairs in a room for a large number of people we might round down to estimate the number of chairs to make sure there are enough. •We can think of place value in additive terms: 456 is 400 + 50 + 6, or in multiplicative terms: one hundred is ten times as large as ten. **Addition and subtraction** **Year 3** Relating numbers to 5 and 10 helps develop knowledge of the number	**Fractions** **Year 3** •Fractions are equal parts of a whole. •Equal parts of shapes do not need to be congruent but need to be equal in area. •Decimal fractions are linked to other fractions. •The number line is a useful representation that helps children to think about fractions as numbers. **Year 4** •Fractions arise from solving problems, where the answer lies between two whole numbers. •Fractions express a relationship between a whole and equal parts of a whole. Children should recognise this and speak in full sentences when answering a question involving fractions. For example, in response to the question What fraction of the chocolate bar is shaded? the pupil might say Two sevenths of the whole chocolate bar is shaded. •Equivalency in relation to fractions is important. Fractions that look very different in their symbolic notation can mean the same thing.	**Geometry** **Year 3** •During this year there is an increasing range of shapes that pupils are familiar with. The introduction of symmetrical and non-symmetrical polygons and the requirement that pupils should be able to draw them will give rise to discussions about lengths of sides and sizes of angles. Pupils need to appreciate these features as properties of shapes as well as the number of sides and vertices. •Pupils recognise that angles are about the amount of turn – the lengths of the lines used to represent angles do not affect the size of the angle. •Pupils recognise that relationships are at the heart of properties of shapes, not particular measurements. For example, the opposite sides of any rectangle will always be equal, not that rectangles have a pair of long sides and a pair of short sides. **Year 4** •During this year, pupils increase the range of 2-D and 3-D shapes that they are familiar with. They know the correct names for these shapes, but, more importantly, they are able to say why certain shapes are what they are by referring to their properties, including lengths	**Number: Place Value** **Year 3** •The value of a digit is determined by its position in a number. •Place value is based on unitising, treating a group of things as one 'unit'. 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For example, given	**Fractions** **Year 3** •Fractions are equal parts of a whole. •Equal parts of shapes do not need to be congruent but need to be equal in area. •Decimal fractions are linked to other fractions. •The number line is a useful representation that helps children to think about fractions as numbers. **Year 4** •Fractions arise from solving problems, where the answer lies between two whole numbers. •Fractions express a relationship between a whole and equal parts of a whole. Children should recognise this and speak in full sentences when answering a question involving fractions. For example, in response to the question What fraction of the chocolate bar is shaded? the pupil might say Two sevenths of the whole chocolate bar is shaded. •Equivalency in relation to fractions is important. 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bonds within 20. For example, given 8 + 7, thinking of 7 as 2 + 5, and adding the 2 and 8 to make 10, then the 5 to 15. This should then be applied when calculating with larger numbers.
Subtraction bonds can be thought of in terms of addition: for example, in answering 15 – 8, thinking what needs to be added to 8 to make 15. Counting on for subtraction is a useful strategy that can also be applied to larger numbers.

Year 4

It helps to round numbers before carrying out a calculation to get a sense of the size of the answer. For example, 4786 – 2135 is close to 5000 – 2000, so the answer will be around 3000. Looking at the numbers in a calculation and their relationship to each other can help make calculating easier. For example, 3012 – 2996. Noticing that the numbers are close to each other might mean this is more easily calculated by thinking about subtraction as difference.

Multiplication and Division

Year 3

•It is important for children not just to be able to chant their multiplication tables but also to understand what the facts in them mean, to be able to use these facts to figure out others and to use in problems. It is also important for children to be able to link facts within the tables (e.g. 5× is half of 10×).
•They understand what multiplication means, see division as both grouping and sharing, and see division as the inverse of multiplication.

Year 4

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of sides, size of angles and number of lines of symmetry.
•The naming of shapes sometimes focuses on angle properties (e.g. a rectangle is right-angled), and sometimes on properties of sides (e.g. an equilateral triangle is an equal sided triangle).
•Shapes can belong to more than one classification. For example, a square is a rectangle, a parallelogram, a rhombus and a quadrilateral.

Measurement

Year 3

•Developing benchmarks to support estimation skills is important as pupils become confident in their use of standard measures. The height of a door frame, for example, is approximately 2 metres, and a bag of sugar weighs approximately 1 kilogram.

Year 4

•The smaller the unit, the greater the number of units needed to measure (that is, there is an inverse relationship between size of unit and measure).

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NCTEM planning link to White Rose planning topics					
Number 1.17 Composition and calculation: 100 and bridging 100 **Addition and Subtraction** 1.18 Composition and calculation: three digit numbers 1,19 Securing mental strategies: calculation up to 999 1.22 Composition and calculation:1000 and four digit numbers 1.20 Algorithms: column addition 1.21 Algorithms: column subtraction **Multiplication and division** 2.7 Times tables: 2,4 and 8 an the relationship between them 2.8 Times tables: 3, 6 and 9 and the relationship between them 2.9 Times tables: 7 and patterns within/across times tables 2.10 Connecting multiplication and division and the distributive law 2.11 Times tables: 11 and 12 2.12 Division with remainders	**Fractions** 3.1 Preparing for fractions: the part-whole relationship 3.2 Unit fractions: identifying, representing and comparing 3.3 Non-Unit fractions: identifying, representing and comparing 3.4 Adding and subtracting within one whole 3.5 Working across one whole: improper fractions and mixed numbers 3.6 Multiplying whole numbers and fractions 1.23 Composition and calculation: tenths 1.24 Composition and calculation: hundredths and thousandths	**Measurement: Money** 1.25 Addition and subtraction: money **Measurement; Perimeter, length and area** 2.16 Multiplicative contexts: area and perimeter 1 **Year 3 mass and capacity** **Year 4:Position and capacity** 2.17 Structures: using measures and comparison to understand scaling	**Number** 1.17 Composition and calculation: 100 and bridging 100 **Addition and Subtraction** 1.18 Composition and calculation: three digit numbers 1,19 Securing mental strategies: calculation up to 999 1.22 Composition and calculation:1000 and four digit numbers 1.20 Algorithms: column addition 1.21 Algorithms: column subtraction **Multiplication and division** 2.7 Times tables: 2,4 and 8 an the relationship between them 2.8 Times tables: 3, 6 and 9 and the relationship between them 2.9 Times tables: 7 and patterns within/across times tables 2.10 Connecting multiplication and division and the distributive law 2.11 Times tables: 11 and 12 2.12 Division with remainders 2.13 Calculation: multiplying and dividing by 10 or 100	**Fractions** 3.1 Preparing for fractions: the part-whole relationship 3.2 Unit fractions: identifying, representing and comparing 3.3 Non-Unit fractions: identifying, representing and comparing 3.4 Adding and subtracting within one whole 3.5 Working across one whole: improper fractions and mixed numbers 3.6 Multiplying whole numbers and fractions 1.23 Composition and calculation: tenths 1.24 Composition and calculation: hundredths and thousandths	**Measurement: Money** 1.25 Addition and subtraction: money **Measurement; Perimeter, length and area** 2.16 Multiplicative contexts: area and perimeter 1 **Year 3 mass and capacity** **Year 4:Position and capacity** 2.17 Structures: using measures and comparison to understand scaling

2.13 Calculation: multiplying and dividing by 10 or 100 2.9 Times tables: 7 and patterns within/across times tables 2.14 Multiplication: portioning leading to short multiplication 2.15 Division: partitioning leading to short division						2.9 Times tables: 7 and patterns within/across times tables 2.14 Multiplication: portioning leading to short multiplication 2.15 Division: partitioning leading to short division					
Let's Think Maths											
The Jelly Family	*Feeding Fish* *Number Monsters*	*Hundreds and Thousands*	*Packing boxes* *Folding Fractions*	*Crime scene Detectives*	*Shape shifters*	*The Giants Palace*	*Sensible Numbers* *Which trees*	*A walk in the hills*	*Folding fractions*	*Graphs galore*	*Cartoon Counting*

Four Marks CE Primary School Maths Curriculum

Key Stage 2 the Programmes of study focus on

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Key Stage 2: Years 5&6 NC Statutory Guidance

Year 5

Place value

- read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
- count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- solve number problems and practical problems that involve all of the above
- read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

Addition and Subtraction

- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- add and subtract numbers mentally with increasingly large numbers
- 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.

Multiplication and Division

- 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 (non-prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

Fractions

- 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, 52 + 54= 56 = 1 51]
- add and subtract fractions with the same denominator and denominators that are multiples of the same number
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- read and write decimal numbers as fractions [for example, 0.71 = 10071]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents

Year 6

Place Value

- 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.

Addition, Subtraction, Multiplication and Division

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- 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 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.

Fractions

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions > 1
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, ¼ × ½ = 1/8]
- divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6]
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8]
- identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- multiply one-digit numbers with up to two decimal places by whole numbers
- use written division methods in cases where the answer has up to two decimal places
- solve problems which require answers to be rounded to specified degrees of accuracy
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

Ratio and proportion

- 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 21 , 41 ,51 , 52 , 54 and those fractions with a denominator of a multiple of 10 or 25.

Measurement

- convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)
- understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
- measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
- calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes
- estimate volume [for example, using 1 cm^3 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.

Geometry

- 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 (o)
- identify: angles at a point and one whole turn (total 360o)
- angles at a point on a straight line and 1/2 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.
- identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.

Statistics

- solve comparison, sum and difference problems using information presented in a line graph
- complete, read and interpret information in tables, including timetables.

- 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

Algebra

- 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.

Measurement

- solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
- use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
- convert between miles and kilometres
- recognise that shapes with the same areas can have different perimeters and vice versa
- recognise when it is possible to use formulae for area and volume of shapes
- calculate the area of parallelograms and triangles
- calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3].

Geometry

- draw 2-D shapes using given dimensions and angles
- recognise, describe and build simple 3-D shapes, including making nets
- compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.
- 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.

Statistics

- interpret and construct pie charts and line graphs and use these to solve problems
- calculate and interpret the mean as an average.

Key Stage 2: Years 5&6					
CYCLE A			**CYCLE B**		
Autumn	**Spring**	**Summer**	**Autumn**	**Spring**	**Summer**
Survival (Island Enquiry)	**Cluedo (Wind Turbines- Miracle or Menace)**	**Who Goes There?**	**The Final Frontier (Shackleton)**	**It's all Greek to me!**	**The Battle of Britain: Bombs, Battles & Bravery.**
Mathematical Language					
Year 5 To read, spell and pronounce mathematical vocabulary correctly. **Year 6** To read, spell and pronounce mathematical vocabulary correctly.					
NCTEM big ideas					
Number: Place Value **Year 5** •Large numbers of six digits are named in a pattern of three: hundreds of thousands, tens of thousands, ones of thousands, mirroring hundreds, tens and ones. •It is helpful to relate large numbers to real-world contexts, for example the number of people that a local sports arena can hold. **Year 6** •For whole numbers, the more digits a number has, the larger it must be: any 4-digit whole number is larger than any 3-digit whole number. But this is not true of decimal numbers: having more digits does not make a decimal number necessarily bigger. For example, 0·5 is larger than 0·35. •Ordering decimal numbers uses the same process as for whole numbers ie we look at the digits in matching places in the numbers, starting from the place with the highest value ie from the left. The number with the higher different digit is the higher number. For example, 256 is greater than 247 because 256 has 5 tens but 247 has only 4 tens. Similarly, 1·0843 is smaller than 1·524 because 1·0843 has 0 tenths but 1·524 has 5 tenths.	**Fractions** **Year 5** •Representations that may appear different sometimes have similar underlying ideas. For example 1/ 4 , 0·25 and 25% are used in different contexts but are all connected to the same idea. **Year 6** •Fractions express a relationship between a whole and equal parts of a whole. Pupils should recognise this and speak in full sentences when answering a question involving fractions. For example, in response to the question 'What fraction of the journey has Tom travelled?' the pupil might respond, 'Tom has travelled two thirds of the whole journey.' •Equivalent fractions are connected to the idea of ratio: keeping the numerator and denominator of a fraction in the same proportion creates an equivalent fraction. •Putting fractions in place on the number lines helps understand fractions as numbers in their own right. **Algebra** **Year 6** •A linear sequence of numbers is where the difference between the values of neighbouring terms is	**Geometry** **Year 5** •During this year, pupils increase the range of 2-D and 3-D shapes that they are familiar with. With 3-D shapes they think about the faces as well as the number of vertices and through considering nets think about the 2-D shapes that define the 3-D shapes. •Pupils learn about a range of angle facts and use them to describe certain shapes and derive facts about them. •Regular shapes have to have all sides and all angles the same. Although non-square rectangles have four equal angles, the fact that they do not have four equal sides means that they are not regular. •Some properties of shapes are dependent upon other properties. For example, a rectangle has opposite sides equal because it has four right angles. A rectangle is defined as a quadrilateral with four right angles. It does not have to be defined as a quadrilateral with four right angles and two pairs of equal sides. **Year 6** •Variance and invariance are important ideas in mathematics, particularly in geometry. 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Addition and Subtraction

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•Before starting any calculation is it helpful to think about whether or not you are confident that you can do it mentally. For example, 3689 + 4998 may be done mentally, but 3689 + 4756 may require paper and pencil.

Carrying out an equivalent calculation might be easier than carrying out the given calculation. For example 3682 – 2996 is equivalent to 3686 – 3000 (constant difference).

Year 6

•Deciding which calculation method to use is supported by being able to take apart and combine numbers in many ways. For example, calculating 8·78 + 5·26 might involve calculating 8·75 + 5·25 and then adjusting the answer. The associative rule helps when adding three or more numbers: 367 + 275 + 525 is probably best thought of as 367 + (275 + 525) rather than (367 + 275) + 525.

Multiplication and Division

Year 5

•Pupils have a firm understanding of what multiplication and division mean and have a range of strategies for dealing with large numbers, including both mental and standard written methods. They see the idea of factors, multiples and prime numbers as connected and not separate ideas to learn.

•They recognise how to use their skills of multiplying and dividing in new problem solving situations.

•Fractions and division are connected ideas: 36 ÷ 18 = 36/18 = 2; 18/36= 1/2

•Factors and multiples are connected ideas: 48 is a multiple of 6 and 6 is a factor of 48.

Year 6

•Standard written algorithms use the conceptual structures of the

constant. The relationship can be generated in two ways: the sequence-generating rule can be recursive, i.e. one number in the sequence is generated from the preceding number (e.g. by adding 3 to the preceding number), or ordinal, i.e. the position of the number in the sequence generates the number (e.g. by multiplying the position by 3, and then subtracting 2).

•Sometimes sequence generating rules that seem different can generate the same sequence: the ordinal rule 'one more than each of the even numbers, starting with 2'generates the same sequence as the recursive rule 'start at 1 and add on 2, then another 2, then another 2, and so on'.

•Sequences can arise from naturally occurring patterns in mathematics and it is exciting for pupils to discover and generalise these. For example adding successive odd numbers will generate a sequence of square numbers.

•Letters or symbols are used to represent unknown numbers in a symbol sentence (i.e. an equation) or instruction. Usually, but not necessarily, in any one symbol sentence (equation) or instruction, different letters or different symbols represent different unknown numbers.

•A value is said to solve a symbol sentence (or an equation) if substituting the value into the sentence (equation) satisfies it, i.e. results in a true statement. For example, we can say that 4 solves the symbol sentence (equation) 9 – = ? + 1 (or 9 – x = x + 1) because it is a true statement that 9 – 4 = 4 + 1. We say that 4 satisfies the symbol sentence (equation) 9 –? =? + 1 (or 9 – x = x + 1).

Ratio and proportion

Year 6

quadrilaterals for example may vary in many ways in terms of area, length of sides and the size of individual angles. However, there are a set of invariant properties which remain common to all quadrilaterals, namely they have four sides and their internal angles sum to 360o. Some of these properties emerge from naturally occurring constraints, for example the sum of the internal angles will always sum to 360o, they can do nothing else! The questions 'What's the same?' and 'What's different?' can draw pupils' attention to variance and invariance.

•Shapes can be alike in essentially two different ways: congruent and similar. Congruent shapes are alike in all ways: they could occupy exactly the same space. Similar shapes share identical geometrical properties but can differ in size. All equilateral triangles are similar, but only identically sized ones are congruent. Not all isosceles triangles are similar.

•Angle properties are a mix of necessary conditions and conventions. It is a necessary condition that angles on a straight line combine to a complete half turn. That we measure the half turn as 180° is conventional.

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NCTEM planning **link to White Rose planning topics**					
Number: Place value **Number: Addition and Subtraction** 1.26 composition and calculation: multiples of 1000 up to 1000,000 **Number: Multiplication and division** 1.27 Negative numbers: counting, comparing and calculating **Statistics** 1.28 Common structures and the part part whole relationship 1.29 Using equivalence and the compensation property to calculate.	**Year 5 Multiplication and Division** **Year 6: Algebra and Ration** 2.18 using equivalence to calculate 2.25 Compensation to calculate 2.19 Calculations: X/÷ decimal fractions by whole numbers 2.20 Multiplication with three factors and volume 2.21 Factors, multiples, prime numbers and composite numbers 2.22 Combining multiplication with addition and subtraction	**Measurement: converting units** 2.27 Scale factors, ratio and proportional reasoning **Geometry: Position and direction** 2.28 Combining division with addition and subtraction **Geometry: Properties of shape** 2.29 Decimal place-value knowledge, multiplication and division **Measurement Perimeter , area and volume**	**Number: Place value** **Number: Addition and Subtraction** 1.26 composition and calculation: multiples of 1000 up to 1000,000 **Number: Multiplication and division** 1.27 Negative numbers: counting, comparing and calculating **Statistics** 1.28 Common structures and the part part whole relationship 1.29 Using equivalence and the compensation property to calculate.	**Year 5 Multiplication and Division** **Year 6: Algebra and Ration** 2.18 using equivalence to calculate 2.25 Compensation to calculate 2.19 Calculations: X/÷ decimal fractions by whole numbers 2.20 Multiplication with three factors and volume. 21 Factors, multiples, prime numbers and composite numbers 2.22 Combining multiplication with addition and subtraction	**Measurement: converting units** 2.27 Scale factors, ratio and proportional reasoning **Geometry: Position and direction** 2.28 Combining division with addition and subtraction **Geometry: Properties of shape** 2.29 Decimal place-value knowledge, multiplication and division **Measurement Perimeter , area and volume**

Four Marks CE Primary School Maths Curriculum

1.30 composition and calculation: numbers up to 10,000,000		2.23 Multiplication strategies for larger numbers and long multiplication 2.24 Division: dividing by 2 digit divisors **Number Fractions** 2.25 Using compensation to calculate 3.7 Finding Equivalent fractions and simplifying fractions 3.8 Common denomination: more adding and subtracting 3.9 multiplying fractions and dividing fractions by a whole number **Number Decimals and percentages** 3.10 Linking fractions, decimals and percentages 2.26 Mean average and equal shares		2.30 Multiplication contexts; area and perimeter **Investigations** 1.31Problems with two unknown		1.30 composition and calculation: numbers up to 10,000,000		2.23 Multiplication strategies for larger numbers and long multiplication 2.24 Division: dividing by 2 digit divisors **Number Fractions** 2.25 Using compensation to calculate 3.7 Finding Equivalent fractions and simplifying fractions 3.8 Common denomination: more adding and subtracting 3.9 multiplying fractions and dividing fractions by a whole number **Number Decimals and percentages** 3.10 Linking fractions, decimals and percentages 2.26 Mean average and equal shares		2.30 Multiplication contexts; area and perimeter **Investigations** 1.31Problems with two unknown	
Let's Think Maths											
Caterpillars *Beanbag Pick Up* *Pencils and Rulers*	*Scaffolding* *Comparing Texts* *Largest Rectangle*	*Share an Apple*	*Gardens* *Rooves*	*Design a Desk*	*Tessellating Triangles* *One Way Tracks (odd and even)*	*Digital detectives* *Picturing numbers*	*Sports League* *Who dun it?*	*Halving and thirding*	*Cups and Saucers* *Half Time Scores*	*Robots* *Pegboard Symmetry*	*Which Way Up?*