

# Primary Mathematics Scheme of Work: Class 2 Year 1 and Year 2



	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Autumn 1	Number: Place Value Y1-Numbers within 10 Y2-Numbers within 100				Number: Addition and Subtraction Y1-Numbers within 20 Y2- Addition and Subtraction		
Autumn 2	Number: Addition and Subtraction Y1-Numbers within 50 Y2- Addition and Subtraction			Geometry- Shape	2	Number: Plac Y1- Numbers Y2-Consolidat	e Value within 100 tion
Spring 1	Measurement: Money			Number: Addition and Subtraction Y1-Numbers within 20 Number Y2- Multiplication and Division			
Spring 2	Number: Multiplication and Division		Measurement: Length and Height	Number: Fractions			
Summer 1	Statistics		Measurement Y1- Mass and V Y2- Mass, Capa Temperature	olume city and	Geometry: Position a	nd Direction	
Summer 2	Geometry Y1-Shape Y2- Position and D	Direction	Measurement Y1- Time Y2- Time		Number: Four Operat	tions Consolida	ition

# Year 1

### Number: Place Value

# Key concepts (National Curriculum Statements)

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

#### Notes and guidance (non-statutory)

• Pupils practise counting (1, 2, 3...), ordering (for example, first, second, third...), and to indicate a quantity (for example, 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent.

- Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by objects and pictorial representations.
- They practise counting as reciting numbers and counting as enumerating objects, and counting in 2s, 5s and 10s from different multiples to develop their recognition of patterns in the number system (for example, odd and even numbers), including varied and frequent practice through increasingly complex questions.
- They recognise and create repeating patterns with objects and with shapes.
- Pupils practise counting (1, 2, 3...), ordering (for example, first, second, third...), and to indicate a quantity (for example, 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent.
- Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by objects and pictorial representations.
- They practise counting as reciting numbers and counting as enumerating objects, and counting in 2s, 5s and 10s from different multiples to develop their recognition of patterns in the number system (for example, odd and even numbers), including varied and frequent practice through increasingly complex questions.

#### • They recognise and create repeating patterns with objects and with shapes.

Possible Themes	Key learning points	
<ul> <li>Explore the value of numbers</li> <li>Explore where numbers live in our number system</li> <li>Solve problems comparing the value of numbers</li> <li>Investigate number patterns</li> </ul>	<ul> <li>Show the value of a number using objects or pictures</li> <li>Read numbers to 20 in numerals and words</li> <li>Write numbers to 20 and beyond in numerals</li> <li>Write numbers to 20 and beyond in numerals</li> <li>Write numbers to 20 in words</li> <li>Identify and represent numbers using pictorial representations</li> <li>Compare the value of numbers explaining if they are more/ less than or equal to another number or numbers</li> <li>Compare the value of numbers explaining if they are more/ less than or equal to another number or numbers</li> <li>Read and write numbers to 100 in numerals</li> <li>Count on to or back from numbers in ones from any given number up to 100</li> <li>Count in multiples of two starting from zero</li> <li>Count in multiples of ten starting from zero</li> <li>Count in multiples of ten starting from zero</li> </ul>	
Prerequisite EYFS – development matters (months)	NCETM – Ready to Progress	
16 - 26 ✓ Says some counting words randomly	Count within 100, forwards and backwards, beginning with 0 or 1, or from any given number	
22 - 36 ✓ Recites some number names in sequence. ✓ Creates and experiments with symbols and marks representing ideas of number	<ul> <li>count forwards from 80 to 110</li> <li>count backwards from 105</li> </ul>	

30 - 50	<ul> <li>✓ Uses some number names and number language spontaneously.</li> <li>✓ Uses some number names accurately in play.</li> <li>✓ Recites numbers in order to 10.</li> <li>✓ Knows that numbers identify how many objects are in a set.</li> <li>✓ Beginning to represent numbers using fingers, marks on paper or pictures.</li> <li>✓ Sometimes matches numeral and quantity correctly.</li> <li>✓ Shows curiosity about numbers by offering comments or asking questions</li> <li>✓ Shows an interest in numerals in the environment.</li> <li>✓ Shows an interest in representing numbers.</li> <li>✓ Realises not only objects, but anything can be counted, including steps, claps or jumps.</li> </ul>		Count, read and write numbers to 100 in numerals; count in Find p 39 in a book Make a label to show how many things were in you Count groups of 10 each of 2p, 5p and 10p coins Identify and represent numbers using objects and pictorial re- more than, less than (fewer), most, least I'm giving each of you a strip of card with some nu- Point to the number which is worth most. Now pool Make these numbers using tens and ones apparat Why have you put this number there?	multiples of twos, fives and tens our collection epresentations including the number line, and use the language of: equal to, umbers on [five numbers at random from 0 to 30]. int to the number which is worth least. us and put them in order.
<ul> <li>A Recognise some numerals of personal significance.</li> <li>A Recognises numerals 1 to 5.</li> <li>Counts up to three or four objects by saying one number name for each item.</li> <li>A0 -</li> <li>Counts actions or objects which cannot be moved.</li> <li>Counts objects to 10, and beginning to count beyond 10.</li> <li>Counts out up to six objects from a larger group.</li> <li>Selects the correct numeral to represent 1 to 5, then 1 to 10 objects.</li> <li>Counts an irregular arrangement of up to ten objects.</li> </ul>		Read and write numbers from 1 to 20 in numerals and words Make some labels for collections using numbers and words.		
Reasc	oning opportunities and probing questions	Mathematical Lan	guage	Possible misconceptions
<ul> <li>Show me (find/ write) the number that will label this group of objects. And Another. And Another.</li> <li>Show me (find/write) a number with 2 tens and another and another. Which of your numbers is the greatest? And Another.</li> <li>Can you change this pot so that it has enough pencils for 8 children?</li> <li>Convince me that 13 is less than 20.</li> <li>Always/Sometimes/Never: A number with 9 in the units is always bigger than one with 6 in the units.</li> <li>Show me (find/write) anumber with 9 in the units is always bigger than one with 6 in the units.</li> <li>One, Two, Three, Four, Five Fourteen, Fifteen, Sixteen, Seventeen, Eighteen, Sixteen, Seventeen, Eighteen, Seventeen, Seventeen, Eighteen, Seventeen, Seventeen, Seventeen, Eighteen, Seventeen, Seve</li></ul>		e, Six, Seven, Eight, Nine, Ten, Eleven, Twelve, Thirteen, en, Nineteen, Twenty bigger as, as many as gest 5)	<ul> <li>Some pupils may appear to be counting confidently but they may just be mimicking the rhythm of the counting pattern.</li> <li>Some pupils may not be confident in counting over the tens boundaries</li> <li>Some pupils may not understand that a number can be used to show/ label the final (cardinal) value of the set of objects being counted, i.e. the final number that they have said represents the value of the objects in the set.</li> <li>Some pupils may muddle the 'teen' and the 'ty' numbers</li> <li>Some pupils may read the units digit before the tens digit.</li> </ul>	

# Number: Addition and Subtraction

#### Key concepts (National Curriculum Statements) 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.

#### Notes and guidance (non-statutory)

• Pupils practise counting (1, 2, 3...), ordering (for example, first, second, third...), and to indicate a quantity (for example, 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent.

• Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by objects and pictorial representations.

• They practise counting as reciting numbers and counting as enumerating objects, and counting in 2s, 5s and 10s from different multiples to develop their recognition of patterns in the number system (for example, odd and even numbers), including varied and frequent practice through increasingly complex questions.

• They recognise and create repeating patterns with objects and with shapes.

• Pupils practise counting (1, 2, 3...), ordering (for example, first, second, third...), and to indicate a quantity (for example, 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent.

• Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by objects and pictorial representations.

• They practise counting as reciting numbers and counting as enumerating objects, and counting in 2s, 5s and 10s from different multiples to develop their recognition of patterns in the number system (for example, odd and even numbers), including varied and frequent practice through increasingly complex questions.

• They recognise and create repeating patterns with objects and with shapes.

#### Possible Themes

#### Key learning points

- Explore the value of numbers
- Explore where numbers live in our number system
- Solve problems comparing the value of numbers
- Investigate number patterns
- Investigate one more or one less than any number
- Investigate number patterns
- Explore addition and subtraction facts

- Show the value of a number using objects or pictures
- Read numbers to 20 in numerals and words
- Write numbers to 20 and beyond in numerals
- Write numbers to 20 in words
- Identify and represent numbers on the number line
- Identify and represent numbers using pictorial representations
- Compare the value of numbers explaining if they are more/less than or equal to another number or numbers
- Read and write numbers to 100 in numerals
- Count on to or back from numbers in ones from any given number up to 100
- Count in multiples of two starting from zero
- Count in multiples of five starting from zero
- Count in multiples of ten starting from zero
- Identify the number that is one more than a given number
- Identify the number that is one less than a given number
- Know addition facts to 10
- Know subtraction facts from 10
- Know addition facts within 10
- Know subtraction facts within 10
- Know addition facts to 20
- Know subtraction facts from 20
- Know addition facts within 20
- Know subtraction facts within 20
- Count to and across 100 and beyond in ones from any number
- Count back from 100 and beyond in ones from any number
- Add two one-digit numbers to 20, including zero
- Add a one-digit and two-digit numbers to 20, including zero
- Read and interpret statements involving the symbols '+' and '=' involving numbers up to 20
- Write statements involving the symbols '+' and '=' involving numbers up to 20
- Subtract one-digit number (a) from another one-digit number (b, a<b) within 20, including zero
- Subtract a one-digit number from a two-digit numbers within 20, including zero
- Read and interpret statements involving the symbols '-' and '=' involving numbers up to 20
- Write statements involving the symbols '-' and '=' involving numbers up to 20
- Solve one-step problems calculations involving numbers up to 20 using concrete objects and pictorial representations
- Solve missing number problems involving adding numbers to 20
- Solve missing number problems involving subtracting numbers within 20

Prerequisite	e	NCETM – Ready to Progress
16-26	✓ Says some counting words randomly	count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number count forwards from 80 to 110 count backwards from 105
22-36	✓ Recites some number names in sequence. Creates and experiments with symbols and marks representing ideas of number	<ul> <li>Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens</li> <li>Find p 39 in a book</li> <li>Make a label to show how many things were in your collection</li> <li>Count groups of 10 each of 2p. Ep and 10p spins</li> </ul>
30-50	<ul> <li>Uses some number names and number language spontaneously.</li> <li>Uses some number names accurately in play.</li> <li>Recites numbers in order to 10.</li> <li>Knows that numbers identify how many objects are in a set.</li> <li>Beginning to represent numbers using fingers, marks on paper or pictures.</li> <li>Sometimes matches numeral and quantity correctly.</li> <li>Shows curiosity about numbers by offering comments or asking questions</li> <li>Shows an interest in numerals in the environment.</li> <li>Shows an interest in representing numbers.</li> <li>Realises not only objects, but anything can be counted, including steps, claps or jumps.</li> </ul>	<ul> <li>Count groups of 10 each of 2p, 5p and 10p coins</li> <li>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</li> <li>I'm giving each of you a strip of card with some numbers on [five numbers at random from 0 to 30].</li> <li>Point to the number which is worth most. Now point to the number which is worth least.</li> <li>Make these numbers using tens and ones apparatus and put them in order.</li> <li>Why have you put this number there?</li> <li>read and write numbers from 1 to 20 in numerals and words</li> <li>Make some labels for collections using numbers and words.</li> <li>read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</li> <li>Use the vocabulary add, subtract, minus, equals, is the same value as, total, more than, fewer/less than.</li> <li>Explain that things on both sides of the equals sign have the same value</li> </ul>
40-60+	<ul> <li>✓ Recognise some numerals of personal significance.</li> <li>✓ Recognises numerals 1 to 5.</li> <li>✓ Counts up to three or four objects by saying one number name for each item.</li> <li>✓ Counts actions or objects which cannot be moved.</li> <li>✓ Counts objects to 10, and beginning to count beyond 10.</li> <li>✓ Counts out up to six objects from a larger group.</li> <li>✓ Selects the correct numeral to represent 1 to 5, then 1 to 10 objects.</li> <li>✓ Counts an irregular arrangement of up to ten objects.</li> <li>Early Learning Goal</li> <li>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. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.</li> </ul>	<ul> <li>Know that the 'total' can be presented on either side of the equals sign</li> <li>Complete 'empty box' number sentences</li> <li>represent and use number bonds and related subtraction facts within 20</li> <li>I'm thinking of a number. I've subtracted 6 and the answer is 8. What number was I thinking of? Explain how you know.</li> <li>I'm thinking of a number. I've added 7 and the answer is 8. What number was I thinking of? Explain how you know.</li> <li>I know that 6 and 4 is 10. How can I find 7 + 47 How could you work it out?</li> <li>add and subtract one-digit and two-digit numbers to 20, including zero</li> <li>What is 37 subtract 10? How did you work that out? How could you show that using cubes/a number line/a 100-square? What would 37 subtract 20 be?</li> <li>Make up some difference questions with the answer 5. Can you show how to solve them using counters? Can you show how to find the answer on a number line?</li> <li>solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = 7 - 9.</li> <li>Make up some additions with the answer 15. Try to put them in different ways, like this: 10 + 5 = 15. The total of 10 and 5 is 15. 10 and 5 more makes 15.</li> <li>How many ways can you show me that 9 subtract 3 is 6?</li> <li>Make up some subtractions with the answer 5. Try to put them in different ways, like this: 11 - 6 = 5. The difference between 6 and 11 is 5.</li> </ul>

Reasoning opportunities and probing questions	Mathematical Language	Possible misconceptions
<ul> <li>Show me (find/ write) the number that will label this group of objects. And Another. And Another.</li> <li>Show me (find/write) a number with 2 tens and another and another. Which of your numbers is the greatest? And Another.</li> <li>Can you change this pot so that it has enough pencils for 8 children?</li> <li>Convince me that 13 is less than 20.</li> <li>Always/Sometimes/Never: A number with 9 in the units is always bigger than one with 6 in the units.</li> <li>I'm thinking of a number. It is 1 more / less than 36. What number am I thinking of?</li> <li>Kenny says that one less than 53 is 43. Is he correct?</li> <li>I will clap where a number is missing: 78, 79, 80 clap 82, 83, 84 What number did I miss?</li> <li>If I know that 3 + 7 = 10, what else do I know?</li> <li>What facts can you tell me from this array?</li> </ul>	One, Two, Three, Four, Five, Six, Seven, Eight, Nine, Ten, Eleven, Twelve, Thirteen, Fourteen, Fifteen, Sixteen, Seventeen, Eighteen, Nineteen, Twenty More than, greater, larger, bigger Less than, fewer, smaller Equal to, the same amount as, as many as Greatest/ Most/biggest/largest Least/fewest/smallest Hundreds, Tens, units (ones) Exchange Digit	<ul> <li>Some pupils may appear to be counting confidently but they may just be mimicking the rhythm of the counting pattern.</li> <li>Some pupils may not be confident in counting over the tens boundaries</li> <li>Some pupils may not understand that a number can be used to show/ label the final (cardinal) value of the set of objects being counted, i.e. the final number that they have said represents the value of the objects in the set.</li> <li>Some pupils may muddle the 'teen' and the 'ty' numbers</li> <li>Some pupils may read the units digit before the tens digit.</li> <li>Some pupils might count the number that they are starting from as one of the numbers in the count when adding on or counting back.</li> <li>Some pupils may appear to be counting pattern.</li> <li>When exploring related number facts some pupils may just manipulate the numbers and record incorrectly. For example instead of understanding that they need to subtract from the largest number (for example 10 - 6 = 4) they may move the numbers around because they think they are related (for example 6 - 4 = 10).</li> </ul>

# Multiplication and Division

# Key concepts (National Curriculum statements)

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.

- Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.
- They make connections between arrays, number patterns, and counting in twos, fives and tens

Possible Themes	Key learning points
<ul> <li>Develop arithmetic skills</li> <li>Explore properties of numbers</li> <li>Explore ways of writing calculations</li> <li>Solve problems involving multiplication and division</li> </ul>	<ul> <li>Double numbers up to at least 10</li> <li>Halve numbers up to (at least) 20</li> <li>Count (from zero) in equal steps of 2s</li> <li>Count (from zero) in equal steps of 10s</li> <li>Use concrete objects to solve one-step problems involving multiplication</li> <li>Use concrete objects to solve one-step problems involving division (grouping)</li> <li>Use concrete objects to solve one-step problems involving multiplication</li> <li>Use concrete objects to solve one-step problems involving multiplication</li> <li>Use concrete objects to solve one-step problems involving division (sharing equally)</li> <li>Use pictorial representations to solve one-step problems involving division (grouping)</li> <li>Use pictorial objects to solve one-step problems involving division (grouping)</li> <li>Use pictorial objects to solve one-step problems involving division (grouping)</li> <li>Use arrays to solve one-step problems involving division (sharing equally)</li> <li>Use arrays to solve one-step problems involving division (sharing equally)</li> </ul>

Prerequisite		NCETM – Ready to Progress	
<ul> <li>✓ Pupils need to be able to read, write and order numbers to at least 20</li> <li>✓ Subitise small groups of objects (i.e. can say how many there are without needing to count each individual object.)</li> </ul>		<ul> <li>solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of a teacher</li> <li>Children should be able to: <ul> <li>Use practical apparatus, arrays and images to help solve multiplication and division problems such as:</li> <li>Ben had 5 football stickers. His friend Tom gave him 5 more, how many does he have altogether?</li> <li>Share 12 sweets between two children. How many do they each have?</li> <li>Find half of and double a number or quantity:</li> <li>16 children went to the park at the weekend. Half that number went swimming. How many children went swimming?</li> <li>I think of a number and halve it. I end up with 9, what was my original number?</li> </ul> </li> </ul>	
Reasoning opportunities and probing questions Mathematical L		iguage	Possible misconceptions
<ul> <li>Show me a number that you can half. And another. And another.</li> <li>Convince me double 6 is 12.</li> <li>Convince me 3 multiplied by 4 is 12 (using concrete apparatus such as Numicon, Cuisenaire, etc.).</li> <li>Convince me if 12 sweets are shared equally between 3 friend, each friend will receive 4 sweets (using concrete apparatus such as Numicon, Cuisenaire, etc.).</li> <li>Benny thinks you can double any number but only halve even numbers. Do you agree with Benny? Explain your answer.</li> </ul>	Calculation, Calculate Odd, Even Multiply, Multiplication, Tir Repeated addition Array Divide, Division Groups Grouping Sharing	nes, Product	<ul> <li>Some pupils may interpret '3 multiplied by 4' as '4 groups/lots of 3' rather than '3 groups/lots of 4'</li> <li>Some pupils may try to give whole number answers for the half of an odd number – e.g. Half of 9 is 4 (or 5)</li> <li>Some pupils may not share equally when solving division problems – e.g. Divide 10 by 2: Answer 6 and 4</li> </ul>

# Fractions

#### Key concepts (National Curriculum statements) 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.

- Pupils are taught half and quarter as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. For example, they could recognise and find half a length, quantity, set of objects or shape.
- Pupils connect halves and quarters to the equal sharing and grouping of sets of objects and to measures, as well as recognising and combining halves and quarters as parts of a whole.

Possible Themes	Key learning points
Explore fractions	Recognise a half as one of two equal parts of an object or shape
	Recognise a half as one of two equal parts of a quantity
	Recognise a quarter as one of four equal parts of an object or shape
	Recognise a quarter as one of four equal parts of a quantity
	Use fraction notation to write one half
	Use fraction notation to write one quarter
	Identify half of a set of objects
	Identify quarter of a set of objects

Prerequisite		NCETM – Ready to Progress	
		<ul> <li>recognise, find and name a half as one of two equal parts of a</li> <li>Here is a set of 12 pencils How many is half the set?</li> <li>Shade one quarter of each shape</li> </ul>	an object, shape or quantity
<ul> <li>✓ Know the language of double and half</li> <li>✓ Know the meaning of the word 'equal'</li> </ul>		<ul> <li>recognise, find and name a quarter as one of four equal parts</li> <li>Four Children share 12 strawberries into equal part How many strawberries will each child have?</li> </ul>	of an rts.
Reasoning opportunities and probing questions	Mathematical Lan	guage	Possible misconceptions
<ul> <li>(Given a 2 by 2 grid) Show me ½ of this shape. And another, and another</li> <li>(Given a 4 by 3 grid) Show me ¼ of this shape. And another, and another</li> <li>Convince me that you can split a group of 9 objects in half</li> <li>Kenny says that he would like the bigger half. Is this possible? Explain your answer.</li> </ul>	Part Equal Whole Half, halves Quarter Fraction Numerator Denominator <b>Notation</b> Horizontal bar for fractions; %	$\frac{1}{2}, \frac{1}{4}$	<ul> <li>Some pupils may not understand that when splitting one whole into a fractional amount, each part must be equal</li> <li>Some pupils may think that a quarter is a larger piece than a half since 4 is greater 2</li> <li>Some pupils may not appreciate that when shading a fraction of a shape, the position of the shaded section can vary</li> </ul>

#### Measurement

# Key concepts (National Curriculum statements)

#### Pupils should be taught to:

- 1. 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]
- 2. measure and begin to record the following:
- lengths and heights
- mass/weight
- capacity and volume
- time (hours, minutes, seconds)
- 3. recognise and know the value of different denominations of coins and notes
- 4. sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
- 5. recognise and use language relating to dates, including days of the week, weeks, months and years
- 6. tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.

#### Notes and guidance (non-statutory)

- The pairs of terms: mass and weight, volume and capacity, are used interchangeably atthis stage.
- Pupils move from using and comparing different types of quantities and measures using non-standard units, including discrete (for example, counting) and continuous (for example, liquid) measurement, to using manageable common standard units.
- In order to become familiar with standard measures, pupils begin to use measuring tools such as a ruler, weighing scales and containers.
- Pupils use the language of time, including telling the time throughout the day, first using o'clock and then half past.

Possible Themes

Key learning points

<ul> <li>Explore the measurement of distance</li> <li>Explore the measurement of mass</li> <li>Explore the measurement of capacity</li> <li>Measure time</li> </ul>	<ul> <li>Measure length using appropriate equipment</li> <li>Measure mass using appropriate equipment</li> <li>Measure capacity using appropriate equipment</li> <li>Measure time using hours, minutes and seconds using appropriate equipment</li> <li>Record measurements using a system of non-standard or standard units</li> <li>Compare and order lengths using long/short, longer/shorter, tall/short, double/half</li> <li>Compare and order masses using heavy/light, heavier than, lighter than</li> <li>Compare and order capacities using full/empty, more than, less than, half, half full, quarter</li> <li>Compare and order times using quicker, slower, earlier, later</li> <li>Select appropriate language when making comparisons</li> <li>Solve practical problems involving lime</li> <li>Recognise the coins: 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2</li> <li>Read and say amounts of money using the coins £1 and £2</li> <li>Count, say and record amounts of money using the coins 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2</li> <li>Recognise the notes: £5 and £10</li> <li>Read and say amounts of money using the notes £5 and £10</li> <li>Solve simple problems involving money</li> </ul>
Prerequisite	NCETM – Ready to Progress
<ul> <li>Enjoys filling and emptying containers</li> <li>Beginning to categorise objects according to properties such as shape or size.</li> <li>Begins to use the language of size.</li> <li>Beginning to talk about the shapes of everyday objects, e.g. 'round' and 'tall'.</li> <li>Can describe their relative position such as 'behind' or 'next to'.</li> <li>Orders two or three items by length or height.</li> <li>Orders two items by weight or capacity.</li> </ul>	<ul> <li>Use their experience of standard units to make realistic estimates, answering questions such as: <ul> <li>is the table taller or shorter than a metre?</li> <li>is this doll taller or shorter than one of the class rulers?</li> <li>Does this bottle hold more or less than the litre jug?</li> <li>Which of these things do you think will weigh less than a kilogram?</li> </ul> </li> <li>Use standard units to measure and compare objects. For example, they place metre sticks end-to-end to find out how much wider the hall is than the classroom. They use a litre jug to measure how much more the washing-up bowl holds than the cola bottle.</li> <li>recognise and know the value of different denominations of coins and notes</li> <li>Distinguish coins by sorting them and start to understand their value. They begin to recognise that some coins have a greater value than others, and will buy more: for example, 2p is worth more than 1p; 5p is worth more than 2p; £2 is worth more than f1. They play money games and collect 1p or 2p coins to the value of 10p and begin to count up 'how much this is altogether'. They extend their activities in the classroom shop, paying for items that cost 1p, 3p, 5p, 7p or 9p using only 2p coins, and receiving the appropriate amount of change in 1p coins. They use coins to help them to respond to questions such as:</li> <li>Michael had £5. He spent £3. How much did he have left?</li> <li>Rosie had a 10p coin. She spent 3p. How much change did she get?</li> <li>How much altogether is 1p and 2p and 5p?</li> <li>Sunita spent 5p and 6p on toffees. What did she pay altogether?</li> <li>Chews cost 2p each. How much do three chews cost?</li> </ul> <li>An apple costs 12p. Which two coins would pay for it? What combinations of 3 coins would pay for it?</li>

Reasoning opportunities and probing questions	Mathematical Language	Possible misconceptions
<ul> <li>Convince met that you can use metre sticks to measure the mass of a bag of apples</li> <li>Show me a minute (in silence!)</li> <li>Show me an item longer than this ruler. And another, and another</li> <li>Show me an item heavier than this book. And another, and another</li> <li>Kenny thinks that 'the larger the size of the coin, the greater the value of the coin'. Do you agree with Kenny?</li> <li>What is the same and what is different: 2p coin, 5p coin, 10p coin, 20p coin?</li> <li>Always/Sometimes/Never: Coins are circular.</li> </ul>	Measure Length, height, distance Mass, weight Time Capacity, volume Long, short, longer, shorter, tall, taller Heavy, light, heavier, lighter Full, empty, half full Quicker, slower, earlier, later More than, greater than, less than Double, half, quarter Hour, minutes, second Ruler Container Order, Compare Money Coin Note	<ul> <li>Some pupils may think that cm (for example) is a unit for measuring anything</li> <li>Some pupils may think that all times have to be measured in minutes</li> <li>Some pupils may think that the straight line is longer than the wiggly line</li> <li>Some pupils may think that the larger the size of the coin, the greater the value of the coin, for example, a 2p coin is greater in value than a 5p coin.</li> <li>Some pupils may think that all coins are circular. Some pupils may think that there all £1 and £2 are notes not coins.</li> </ul>

# Geometry

#### Key concepts (National Curriculum statements)

#### Pupils should be taught to:

- 1. 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].
- 2. describe position, direction and movement, including whole, half, quarter and three-quarter turns.

- Pupils handle common 2-D and 3-D shapes, naming these and related everyday objects fluently. They recognise these shapes in different orientations and sizes, and know that rectangles, triangles, cuboids and pyramids are not always similar to each other.
- Pupils use the language of position, direction and motion, including: left and right, top, middle and bottom, on top of, in front of, above, between, around, near, close and far, up and down, forwards and backwards, inside and outside.
- Pupils make whole, half, quarter and three-quarter turns in both directions and connect turning clockwise with movement on a clock face.

Possible Themes	Key learning points
Investigate mathematical language to describe movement	<ul> <li>Use mathematical language to describe position</li> <li>Use mathematical language to describe movement along a straight line</li> <li>Use mathematical language to describe a turn, including whole and half turns</li> <li>Use mathematical language to describe a turn, including quarter turns</li> <li>Use mathematical language to describe a turn, including three-quarter turns</li> <li>Describe position, direction and movement, including whole turns</li> <li>Describe position, direction and movement, including half turns</li> <li>Describe position, direction and movement, including quarter and three-quarter turns</li> </ul>

Prerequisite	NCETM – Ready to Progress	
<ul> <li>✓ Describe position using language such as 'behind' or 'next to'</li> <li>✓ Know the language of half and quarter</li> </ul>	Pupils should be taught to describe position, direction and monomorphic terms         > Look at the map. Go to start.         Follow this route from there.         Go to the fourth house on the right.         Draw a ring around it.         > Look at this map         Image: Construction of the start of the star	ovement, including whole, half, quarter and three-quarter turns.
Reasoning opportunities and probing questions Ma	Nathematical Language	Possible misconceptions
Show me a guarter turn. An another, and another     Posi	osition	Some pupils may think that guarter turns have to look like this:
Convince me this is a guarter turn:	rection	
Тор	pp, middle, bottom	
	n top of	<u>b</u>
Jenny walks fours steps forward, turns a quarter turn clockwise and In fr	front of	Some pupils may have difficulty remembering left and right
walks 2 steps forward. Lenny says 'if Jenny now walks 2 steps Abo	pove	<ul> <li>Some pupils may get confused with 'clockwise'</li> </ul>
backwards, turns a quarter turn clockwise and walks four steps Betw	etween	
backwards, she will return to the start.'	Around, Near, Close, Far	
Do you agree with Kenny? Explain your answer.	Up, Down	
Kenny says, 'A turn of four quarters turns is the same as doing     Insit	Inside, Outside Forwards, Backwards	
nothing at all'. Do you agree with Kenny? Explain why.	orwards, Backwards	
	וו, הוקוו alf turn Auarter turn Three-quarters turn	
NUETIM: Geometry: Position Direction and Movement Reasoning     Stra	raight	
Line	ne	
Cloc	ockwise	

# Year 2

# Number: Place Value

#### Key concepts (National Curriculum Statements)

#### 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
- read and write numbers to at least 100 in numerals and in words
- use place value and number facts to solve problems.

- Using materials and a range of representations, pupils practise counting, reading, writing and comparing numbers to at least 100 and solving a variety of related problems to develop fluency. They count in multiples of 3 to support their later understanding of a third.
- As they become more confident with numbers up to 100, pupils are introduced to larger numbers to develop further their recognition of patterns within the number system and represent them in different ways, including spatial representations.
- Pupils should partition numbers in different ways (for example, 23 = 20 + 3 and 23 = 10 + 13) to support subtraction. They become fluent and apply their knowledge of numbers to reason with, discuss and solve problems that emphasise the value of each digit in two-digit numbers. They begin to understand 0 as a place holder.

Possible Themes	Key learning points
<ul> <li>Explore the value of numbers</li> <li>Explore where numbers live in our number system</li> <li>Solve problems comparing the value of numbers</li> <li>Represent numbers in different ways</li> </ul>	<ul> <li>Explain the value of each digit in a two- digit number</li> <li>Read numbers to 100 in numerals and words</li> <li>Read numbers to 500 in numerals and words</li> <li>Write numbers to 500 in numerals and words</li> <li>Write numbers to 500 in numerals and words</li> <li>Represent and estimate numbers using a number line</li> </ul>
Prerequisites	NCETM – Ready to Progress

<ul> <li>Read and write numbers from 1 to 20 in numerals and words</li> <li>Identify and represent numbers using objects and pictorial representations including the number line</li> <li>Use the language of more than/ less than (fewer), most, least, equal to when comparing value of numbers</li> </ul>	<ul> <li>Recognise the place value of each digit in a two-digit number</li> <li>&gt; Look at these numbers. 37 12 45 60 72 27 Wh Which of these numbers is between 10 and 20?</li> <li>&gt; What is the value of? (point to digits in the list Identify, represent and estimate numbers using different rep</li> <li>&gt; Children should be able to represent numbers us and number lines.</li> <li>&gt; Look at the squares of chocolate There are 16 squares</li> <li>Tick( ✓) the sum that matches the picture <ul> <li>5+2+9=16</li> <li>5+6+5=16</li> <li>6+6+4=16</li> <li>6+2+8=16</li> <li>8+3+5=16</li> </ul> </li> <li>Read and write numbers to at least 100 in numerals and in w</li> <li>&gt; Children should be able to answer questions, suc What numbers can you make using two of these of Write down each number you make. Read those numbers to</li> </ul>	rr (tens, ones) ich of these numbers is the largest? : above) presentations, including the number line ing equipment such as bundles of ten and single art-straws, 10p and 1p coins Image: Image: Ima
Reasoning opportunities and probing questions Mathematica	Language	Possible misconceptions
<ul> <li>Show me a number that has more/ less tens/units than this number. And Another.</li> <li>Convince me that 53 is less than 58</li> <li>Kenny says that 67 is greater than 97. Is he correct?</li> <li>What is the same and what is different about these two numbers: 16 and 61?</li> <li>Always/Sometimes/Never: A number with 7 in the units will always be greater than a number with 5 in the units?</li> <li>Place value Digit One-digit Two-digit Three-digit Hundreds, tens, ones Number words to on Estimate Represent Partition Exchange</li> </ul>	(units) hundred	<ul> <li>Some pupils may muddle the 'teen' and the 'ty' numbers</li> <li>Some pupils may read the units digit before the tens or hundreds digits.</li> <li>Some pupils may record numbers incorrectly (for example one hundred and twenty-three as 10023)</li> <li>Some pupils may not understand the importance of 0 as a place holder and may therefore make errors in recording. (For example one hundred an 5 as 15)</li> </ul>

# Number: Addition and Subtraction

#### Key concepts (National Curriculum statements) Pupils should be taught to:

- 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
- 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

- Pupils extend their understanding of the language of addition and subtraction to include sum and difference.
- Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3 + 7 = 10; 10 7 = 3 and 7 = 10 3 to calculate 30 + 70 = 100; 100 70 = 30 and 70 = 100 30.
- They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, 5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5). This establishes commutativity and associativity of addition.
- Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.

Possible Themes	Key learning points
<ul> <li>Explore addition and subtraction facts</li> <li>Explore mental strategies to solve calculations</li> <li>Use the inverse relationship between addition and subtraction</li> <li>Solve problems addition or subtraction</li> </ul>	<ul> <li>Recall and use addition facts within 20</li> <li>Derive addition facts within 100</li> <li>Understand why addition is commutative</li> <li>Add a two-digit number and tens using concrete objects, pictorial representations, and mentally</li> <li>Add two-digit numbers using concrete objects, pictorial representations, and mentally</li> <li>Add three one-digit numbers using concrete objects, pictorial representations, and mentally</li> <li>Add three one-digit numbers using concrete objects, pictorial representations, and mentally</li> <li>Add two-digit numbers using concrete objects, pictorial representations, and mentally</li> <li>Recall and use subtraction facts within 20</li> <li>Derive subtraction facts within 100</li> <li>Understand why subtraction is not commutative</li> <li>Subtract ones from a two-digit number using concrete objects, pictorial representations, and mentally</li> <li>Subtract two two-digit number using concrete objects, pictorial representations, and mentally</li> <li>Subtract two two-digit number using concrete objects, pictorial representations, and mentally</li> <li>Subtract two two-digit number using concrete objects, pictorial representations, and mentally</li> <li>Solve problems involving addition or subtraction using concrete objects and pictorial representations</li> <li>Solve missing number problems</li> <li>Check calculations using the correct inverse operation</li> </ul>

Prerequisite		NCETM – Ready to Progress
<ul> <li>Understand the value of digits in two-digit numbers</li> <li>Interpret a mathematical statement involving the symbols + a</li> <li>Add and subtract one- and two-digit numbers to 20, including</li> </ul>	and = or – and = ; 0	<ul> <li>solve problems with addition and subtraction:</li> <li>&gt; Use partitioning, counting strategies and knowledge of number bonds to add or subtract a one-digit number or a multiple of 10 to any two-digit number. To work out 86 - 50, for example, they might partition and calculate: 86 - 50 = 80 + 6 - 50 = 80 - 50 + 6 = 30 + 6 = 36</li> <li>&gt; Similarly, to find the total number of people on a bus with 14 people on the top deck and 8 below, they might use: 14 + 8 = 14 + 6 + 2 = 20 + 2 = 22</li> <li>&gt; Children add or subtract two-digit numbers using practical and informal methods and their knowledge of the relationships between operations. For example, they count back along a number line to find 64 - 25 or count up from 67 to find the answer to 94 - 67. They represent such calculations as number sentences. They calculate the value of an unknown in a number sentence such as □ ± 2 = 6 or 85 - □ = 29. They recognise, for example, that to answer 85 - □ = 29 they could use the related addition 29 + □ = 85</li> <li>&gt; recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100</li> <li>&gt; Extend their knowledge and use of number facts, and use partitioning and number bonds to add and subtract numbers mentally to answer questions such as: Look at this number sentence: □ + □ = 20. What could the two missing numbers be? What else? Can you tell me all the pairs of numbers that make 20?</li> <li>show that addition of two numbers and be one in any order (commutative) and subtraction of one number from another cannot</li> <li>&gt; Understand that addition can be done in any order and use this to solve an addition by rearranging the numbers to simplify the operation. They need to understand that two numbers can be taken away from each other but that the answers will not be the same.</li> <li>&gt; Look at this number sentence: 74 - 13 = 61</li> <li>&gt; Write three more number sentences ing these numbers. How do you know, without calculating, that the</li></ul>
Reasoning opportunities and probing questions	Mathematical Lang	nguage Possible misconceptions
<ul> <li>If I know that 13 + 7 = 20, what else do I know?</li> <li>Convince me that 36 + 7 = 43</li> <li>Sam says that it doesn't matter which way round you put the numbers when you subtract. Is he correct?</li> <li>Show me a calculation that is equal to 17. And another. And another.</li> <li>Show me a subtraction calculation where it is easier to count on (use addition) to find the difference in value.</li> <li>NCETM: Addition and Subtraction Reasoning</li> </ul>	Add, subtract Count on, count back More, less Plus, minus, total, sum Difference between Partition Bridge Round, adjust Inverse Number line Number facts Multiple of ten, tens bounda	<ul> <li>Some pupils may include the first number in the count (not count on from</li> <li>Some pupils may confuse the language of addition or subtraction, and therefore use the incorrect operation to carry out a calculation</li> <li>Some children may assume commutativity within subtraction and say '2 take away 7' when they should say '7 take away 2'.</li> <li>Many children may think that 2 take away 7 is not possible. It is possible (when negative numbers are introduced in Stage 4), and care with language now will lessen problems with misconceptions later.</li> </ul>

#### Multiplication and Division

#### Key concepts (National Curriculum statements) 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 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 incontexts.

- Pupils use a variety of language to describe multiplication and division.
- Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.
- Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, 40 ÷ 2 = 20, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, 4 × 5 = 20 and 20 ÷ 5 = 4).

Possible Themes	Key learning points
<ul> <li>Possible Themes</li> <li>Develop arithmetic skills</li> <li>Develop knowledge of multiplication tables</li> <li>Explore properties of numbers</li> <li>Explore ways of writing calculations</li> <li>Solve problems involving multiplication and division</li> </ul>	Key learning points         • Recall and use multiplication facts for the 2 times table         • Recall and use multiplication facts for the 10 times table, linking multiplying by 10 to place value         • Understand that multiplication is commutative         • Recall and use division facts for the 2 times table         • Recall and use division facts for the 2 times table         • Recall and use division facts for the 2 times table         • Recall and use division facts for the 10 times table         • Recall and use division facts for the 10 times table         • Recall and use division facts for the 10 times table         • Understand that division is not commutative         • Create mathematical statements for multiplication         • Create mathematical statements for division         • Recognise odd and even numbers         • Use knowledge of commutativity when multiplying and dividing mentally         • Understand the connection between multiplication and repeated addition         • Identify the correct operation(s) required in order to solve a problem         • Solve missing number problems involving multiplication         • Solve missing number problems involving division
	<ul> <li>Recognise out and even numbers</li> <li>Use knowledge of commutativity when multiplying and dividing mentally</li> <li>Understand the connection between multiplication and repeated addition</li> <li>Identify the correct operation(s) required in order to solve a problem</li> <li>Solve missing number problems involving multiplication</li> <li>Solve missing number problems involving division</li> </ul>

Prerequisite	NCETM – Ready to Progress
<ul> <li>✓ Count from zero in 2s, 5s and 10s</li> <li>✓ Use concrete objects to solve problems involving multiplication and division</li> <li>✓ Use pictorial representations to solve problems involving multiplication and division</li> <li>✓ Use arrays to solve problems involving multiplication and division</li> </ul>	<ul> <li>recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers</li> <li>The children should be able to: <ul> <li>Recognise a multiple of 2, 5 or 10 and use their knowledge of multiplication facts to find corresponding division facts. They can say which numbers are odd and which are even.</li> <li>e.g. 2 x 5 = 10, show me three more number facts using these numbers.</li> <li>Is 34 an odd number? How do you know?</li> </ul> </li> <li>calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (+) and equals signs</li> <li>Children should be able to: <ul> <li>Find missing numbers or symbols in a calculation:</li> <li>4 x _ = 20, _ + 10 = 3</li> <li>Anna has 3 boxes of cakes. Each box contains 5 cakes. How many cakes does she have altogether? Show how you worked this out.</li> </ul> </li> <li>show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot</li> <li>Children should be able to: <ul> <li>Use their knowledge of triangles of numbers to show related number facts.</li> <li>e.g. If 6 x 2 = 12 then 2 x 6 = 12 and 12 ÷ 6 = 2.</li> </ul> </li> <li>solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems and apaparatus to help them solve word problems such as: <ul> <li>Use various methods and apparatus to help them solve word problems such as:</li> <li>There are 10 lollies in a bag. Charlie needs 30 lollies for his party. How many bags does he need to buy? Show how you worked this out.</li> </ul> </li> </ul>

Reasoning opportunities and probing questions	Mathematical Language	Possible misconceptions
<ul> <li>Show me an odd (even) number. And another. And other</li> <li>Convince me that the product of two even (odd) numbers is even (odd)</li> <li>If 2 × 6 = 12 then</li> <li>Convince me 0 is even</li> <li>NCETM: <u>Multiplication and Division Reasoning</u></li> </ul>	Calculation, Calculate Multiplication table, Times table Odd, Even Multiply, Multiplication, Times, Product Repeated addition Array Mathematical statement Commutative Divide, Division Inverse Operation Notation: × + and = signs	<ul> <li>Some pupils may not see and/or understand the connection between the multiplication statements 2 × 5 and 5 × 2</li> <li>Some pupils may the see the times tables as a list of isolated, unconnected statements</li> <li>Some pupils may write statements such as 2 ÷ 8 = 4</li> <li>Some pupils may think that 30 is odd because '3' is odd</li> </ul>

### Fractions

#### Key concepts (National Curriculum statements) Pupils should be taught to:

- recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity
- write simple fractions for example,  $\frac{1}{2}$  of 6 = 3 and recognise the equivalence of  $\frac{2}{4}$  and  $\frac{1}{2}$ .

- Pupils use fractions as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. They connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantities, sets of objects or shapes. They meet  $\frac{3}{4}$  as the first example of a non-unit fraction.
- Pupils should count in fractions up to 10, starting from any number and using the ½ and 2/4 equivalence on the number line

Possible Themes	Key learning points	
Explore fractions	<ul> <li>Recognise one quarter as one of four equal parts of an object, shape or quantity and use fraction notation</li> <li>Recognise two quarters as two of four equal parts, or two of one quarter, of an object, shape or quantity and use fraction notation</li> <li>Recognise a three quarters as three of four equal parts, or three of one quarter of an object, shape or quantity and use fraction notation</li> <li>Recognise one third as one of three equal parts of an object, shape or quantity and use fraction notation</li> <li>Recognise one third as one of three equal parts of an object, shape or quantity and use fraction notation</li> <li>Find one quarter of an object, shape or set of objects</li> <li>Find two quarters of an object, shape or set of objects</li> <li>Find one third of an object, shape or set of objects</li> <li>Find one third of an object, shape or set of objects</li> <li>Recognise that a half is equivalent to two quarters</li> <li>Write simple fraction statements involving the fractions <sup>1</sup>/<sub>2</sub> such as <sup>1</sup>/<sub>2</sub> of 6 = 3</li> <li>Write simple fraction statements involving the fractions <sup>1</sup>/<sub>4</sub> such as <sup>1</sup>/<sub>4</sub> of 8 = 2</li> <li>Write simple fraction statements involving the fractions <sup>1</sup>/<sub>4</sub> such as <sup>1</sup>/<sub>4</sub> of 6 = 2</li> </ul>	
Prerequisite	NCETM – Ready to Progress	
<ul> <li>✓ Recognise a half as one of two equal parts of an object, shape or quantity</li> <li>✓ Recognise a quarter as one of four equal parts of an object, shape or quantity</li> </ul>	<ul> <li>recognise, find, name and write fractions <sup>1</sup>/<sub>3</sub>,<sup>1</sup>/<sub>4</sub>, <sup>3</sup>/<sub>4</sub> and <sup>3</sup>/<sub>4</sub> of a length, shape, set of objects or quantity</li> <li>Using bar models to represent and unpick a fraction word problem</li> <li>Sam's Age Sam's Age 2</li> <li>Harrison and sam were talking and Harrison said that if he doubled Sam's age and added 2 he would get 12</li> <li>terms</li> <li>write simple fractions for example, ½ of 6 = 3 and recognise the equivalence of <sup>2</sup>/<sub>4</sub> and ½</li> <li>Would a chocolate lover rather have ½ or <sup>3</sup>/<sub>5</sub> of this bar of chocolate? Explain your answer.</li> </ul>	

Reasoning opportunities and probing questions	Mathematical Language	Possible misconceptions
<ul> <li>Show me ½ of an amount. And another, and another</li> <li>True or false: <ul> <li>½ is greater than ½ because it has a 4 at the bottom and that is a bigger number</li> <li>You can only find one half of even numbers</li> <li>One quarter of 20 is smaller than ½ of 10</li> <li>Three quarters of an amount is larger than one half of an amount</li> </ul> </li> <li>Which is the odd one out and why: 1/2, 1/4, 2/4 ?</li> <li>NCETM: Fractions Reasoning</li> </ul>	Part Equal Whole Half, halves Quarter, three quarters Third Equivalent Fraction Numerator Denominator Unit fraction, non-unit fraction	<ul> <li>Some pupils may not understand that when splitting one whole into a fractional amount, each part must be equal</li> <li>Some pupils may think that to find ¾ you split into 4 and then each of those parts into 3</li> <li>Some pupils may think that a quarter is a larger piece than a third since 4 is greater 3</li> <li>Some pupils may not appreciate that when shading a fraction of a shape, the position of the shaded section can vary</li> </ul>

#### Measurement

#### Key concepts (National Curriculum statements) 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 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.

- Pupils use standard units of measurement with increasing accuracy, using their knowledge of the number system. They use the appropriate language and record using standard abbreviations.
- Comparing measures includes simple multiples such as 'half as high'; 'twice as wide'. They become fluent in telling the time on analogue clocks and recording it.
- Pupils become fluent in counting and recognising coins. They read and say amounts of money confidently and use the symbols £ and p accurately, recording pounds and pence separately.

Possible Themes	Key learning points
<ul> <li>Possible Themes</li> <li>Explore the relationship between units of time</li> <li>Explore the measurement of distance</li> <li>Explore the measurement of apacity</li> <li>Explore the measurement of capacity</li> <li>Measure temperature</li> </ul>	<ul> <li>Know that there are 60 minutes in one hour</li> <li>Know that there are 24 hours in one day</li> <li>Tell the time using quarter past/to the hour on an analogue clock</li> <li>Write the time using quarter past/to the hour on an analogue clock</li> <li>Write the time to five minute intervals on an analogue clock</li> <li>Write the time to five minute intervals on an analogue clock</li> <li>Draw the hands on a clock face to show times to five minutes, including quarter past/to the hour</li> <li>Compare and order a selection of times from earliest to latest or vice versa</li> <li>Choose appropriate units to measure a given length</li> <li>Choose appropriate units to measure a given length</li> <li>Choose appropriate units to measure a given equipment</li> <li>Measure a given times choosing the appropriate equipment</li> <li>Measure a given capacity choosing the appropriate equipment</li> <li>Measure a given capacity choosing the appropriate equipment</li> <li>Estimate a given additance</li> <li>Estimate a given additance</li> <li>Estimate a given additance</li> <li>Estimate a given additance</li> <li>Compare and order capacitis</li> <li>Compare and order capacitis</li> <li>Compare and order capacitis</li> <li>Compare and order measure agives</li> <li>Compare and order capacitis</li> <li>Compare and order engets</li> <li>Compare and order measure agives and a set meases</li> <li>Compare and order measures</li> <li>Compare and order measures to more y combining the coins 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2</li> <li>Count, say and record anounts of money the ama mounts of money</li> <li>Solve practically simple problems involving addition of money</li> <li>Solve practically simple problems of money, including giving change</li> </ul>

erequisite	NCETM – Ready to Progress
<ul> <li>Read the time to the hour and half past</li> <li>Draw the hands on a clock face to show the time to the hour or half past</li> <li>Know the meaning of before, after, next, first, today, yesterday, tomorrow, morning, aftermoon, evening and o'clock</li> <li>Use the language long, short, tall, heavy, light, full, empty, more than, less than, double, half</li> <li>Use a ruler, weighing scale and container to measure length, mass and capacity</li> <li>Know and use the symbols &gt;, &lt; and =</li> <li>Add and subtract one- and two-digit numbers to 20</li> <li>Recognise the coins: 1p. 2p. 5p. 1p0, 20p, 50p, £1 and £2</li> <li>Recognise the notes: £5 and £10</li> </ul>	<ul> <li>compare and sequence intervals of time</li> <li>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.</li> <li>What time does this clock show?</li> <li>Draw a clock showing the time five minutes later.</li> <li>Show your school day on clock faces: when do you leave home, have breaks, go back home, etc.?</li> <li>Suggest sensible units you might use to measure: the height of your table; how much water is in a cup; the weight of my reading book; how go is this line? Now draw a line 2 on fonger than this one.</li> <li>Choose a piece of equipment to help you measure: the weight of none you have breaks, go back home, etc.?</li> <li>Suggest sensible units you might use to measure: the weight of none you have breaks.</li> <li>Choose a piece of equipment to help you measure: the weight of none you have breaks.</li> <li>Choose a piece of equipment to help you measure: the weight of my reading book; how does the classroom is, how long this lesson lasts; how much water</li> <li>About how heavy do you think sabout 10 cm long.</li> <li>About how heavy do you think your pencil case is?</li> <li>How much vater is in this measuring jug?</li> <li>Mega and lack are growing beans. Megan's plant is 25 cm tall. Jack's is 38 cm tall. Whose plant is the taller? By how much? Can you compare them using &gt; or &lt; ?</li> <li>solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change</li> <li>Jess as aved 62p. She spends 15p. How much much money does she have left? She pays with a 50p piece. How much change does she get?</li> <li>recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value</li> <li>Ind different combinations of coins that equal the same amounts of money</li> <li>Hory has the same amount of money but has six there only one possible answer?</li> <li>Why has the same amount of money but has six there only one possible answer?</li> </ul>

Reasoning opportunities and probing questions A	Mathematical Language	Possible misconceptions
<ul> <li>True or false? There are 100 minutes in an hour. There are 12 months in one year. 25 minutes past 6 is same as saying 6:25.</li> <li>Benny says that when the minute hand is pointing to the 5 on a clock face, then it is 5 minutes past the hour. Is he correct? Explain why.</li> <li>Show me a time where the minute hand is past the hour hand. And another, and another</li> <li>Show me a pair of times with a difference of 15 minutes. And another, and another</li> <li>NCETM: Measurement Reasoning</li> <li>Show me something that you would measure in cm. And something else, and something else</li> <li>Show me how to use this apparatus / read this scale</li> <li>Lenny says 'Tall containers always have a greater capacity than shorter ones' Do you agree?</li> <li>True or false: 'I should measure the length of my little finger in m'; 'I should measure the weight of this parcel in ml'</li> <li>Kenny thinks that 'the larger the size of the coin, the greater the value of the coin'. Do you agree with Kenny?</li> <li>What is the same and what is different: 2p coin, 5p coin, 10p coin, 20p coin?</li> <li>Always/Sometimes/Never: Coins are circular.</li> </ul>	Time Hour, minute, second Day O'clock Half past Quarter to, quarter past Clock Hands Analogue nterval Jnit Length, height, distance, width, breadth Mass, weight Temperature Capacity, volume Metre, centimetre Gram, kilogram Litre, millilitre Degrees Celsius Ruler, metre stick, tape measure Scale, scales Money Coin Change Note	<ul> <li>Some pupils may confuse the two different scales on the clock face (the hour scale and the minute scale); e.g. read 10 past 5 as 2 past 10.</li> <li>Some pupils may incorrectly record the minutes on the clock face; i.e. not appreciate the fact that when the minutes are past the hour, the minute hand must be carefully positioned in relation to how many minutes past the hour it is and not point to the hour.</li> <li>Some pupils may decimalise time and incorrectly use 100 seconds = 1 minute or 100 minutes = 1 hour</li> <li>Some pupils may think that you put the end of the ruler (rather than the '0') at the start of a line to measure it.</li> <li>Some pupils may think that milli- refers to 'million'</li> <li>Some pupils may think that the larger the size of the coin, the greater the value of the coin, for example, a 2p coin is greater in value than a 5p coin.</li> <li>Some pupils may think that all coins are circular.</li> <li>Some pupils may ignore the units in the first instance and simply add the numerical value of the coins, for example, 10p coin + £1 coin = 11p or £11</li> </ul>

# Geometry

# Key concepts (National Curriculum statements)

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.
- 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).

- Pupils handle and name a wide variety of common 2-D and 3-D shapes including: quadrilaterals and polygons, and cuboids, prisms and cones, and identify the properties of each shape (for example, number of sides, number of faces). Pupils identify, compare and sort shapes on the basis of their properties and use vocabulary precisely, such as sides, edges, vertices and faces.
- Pupils read and write names for shapes that are appropriate for their word reading and spelling.
- Pupils draw lines and shapes using a straight edge.
- Pupils should work with patterns of shapes, including those in different orientations.
- Pupils use the concept and language of angles to describe 'turn' by applying rotations, including in practical contexts (for example, pupils themselves moving in turns, giving instructions to other pupils to do so, and programming robots using instructions given in right angles).

Possible Themes		Key learning points
<ul> <li>Explore 2 –D shapes</li> <li>Explore 3 –D shapes</li> <li>Compare 2-D and 3-D shapes</li> <li>Investigate mathematical language to destruct the state of the state of</li></ul>	scribe movement	<ul> <li>Identify and describe the properties of pentagons</li> <li>Identify and describe the properties of octagons</li> <li>Identify and describe the properties of 2-D shapes using vertical lines</li> <li>Compare and sort 2-D shapes</li> <li>Identify and describe 2-D shapes on the surface of 3-D shapes</li> <li>Identify and describe the properties of 3-D shapes including the number of edges</li> <li>Identify and describe the properties of 3-D shapes including the number of vertices</li> <li>Identify and describe the properties of 3-D shapes including the number of vertices</li> <li>Identify and describe the properties of 3-D shapes including the number of vertices</li> <li>Identify and describe the properties of cylinders</li> <li>Identify and describe the properties of cones</li> <li>Compare and sort 3-D shapes</li> <li>Use mathematical language to describe position</li> <li>Use mathematical language to describe movement along a straight line</li> <li>Use mathematical language to describe direction of a turn, including meaning of clockwise and anti-clockwise</li> <li>Understand and use the language of right angles to describe the size of turn</li> <li>Interpret instructions for following a simple route</li> <li>Devise instructions of mathematical objects in patterns and sequences</li> <li>Arrange combinations of mathematical objects in patterns and sequences</li> </ul>
Prerequisite		NCETM – Ready to Progress

#### identify and describe the properties of 2-D shapes, including the number of sides and 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 What is a 3-D shape?



> compare and sort common 2-D and 3-D shapes and everyday objects.



can sort two sets of 2D and 3D shapes in 2 or more different ways using different criteria each time. For example, they might choose 'dimensions' or 'right angled'

order and arrange combinations of mathematical objects in patterns

> Describe the patterns in sequences and predict what comes next in the sequence and continue the pattern. use mathematical vocabulary to describe position, direction and movement including distinguishing between rotation as a turn and in terms





- ✓ 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
- ✓ Describe position using language such as 'behind', 'next to', 'on top of' and 'between'
- ✓ Describe position, direction and movement, including whole, half, quarter and threequarter turns
- ✓ Connect moving clockwise with movement on a clock face

#### Watch me as I rotate (turn) this picture of a clown. ≻

(Do not rotate your picture this time)



Rotate the clown smoothly and continuously through a full turn, children a t all times.)

Which of the pictures shows what the clown will look like if I rotate half turn? Tick the picture



(turn) my picture a



Reasoning opportunities and probing questions	Mathematical Language	Possible misconceptions
<ul> <li>Look at the shapes in front of youWhat can you tell me about the shapes?</li> <li>Show me a shape with four sides. And Another. And Another.</li> <li>Convince me that this is a square is a rectangle.</li> <li>Always/Sometimes/Never: A shape with 4 straight sides is a square.</li> <li>Always/Sometimes/Never: A pyramid has one square face</li> <li>Kenny says that a circle has one vertical line of symmetry. Is he correct?</li> <li>NCETM: Geometry - Properties of Shapes Reasoning</li> <li>Show me a quarter turn. An another, and another</li> <li>Always / Sometimes / Never: you need to know the direction of turn if you are asked to turn through two right angles</li> <li>Kenny says, 'A turn of four right angles is the same as doing nothing at all'. Do you agree with Kenny? Explain why.</li> <li>NCETM: Geometry: Position Direction and Movement Reasoning</li> </ul>	2-D shape (polygon) Rectangle, Square, Circle, Triangle and other 2-D shapes Quadrilateral Circular, Triangular, Rectangular 3-D shape Cuboid, Cube, Cone, Cylinder, Pyramid, Sphere, Prism Side, Corner, Line symmetry, Vertical Mirror line, Reflection, Fold Edge, Vertex, Vertices, Face Regular Irregular Forwards, Backwards Left, Right Angle Right angle Turn Quarter, Half, Three quarters Rotation Position Direction	<ul> <li>Some pupils may think that a rectangle and square are the same shape.</li> <li>Some pupils may think that a cuboid and cube are the same solid.</li> <li>Some pupils may misuse the language used to describe the properties of shapes (for example using edges rather than sides when describing 2-D shapes)</li> <li>Some pupils may only recognise shapes when they are in a specific (often horizontal orientation)</li> <li>Some pupils think that all hexagons, pentagons, octagons and decagons are regular</li> <li>Some pupils may think that right angles have to look like this:</li> <li>Some pupils may think that right angles have to be created from a horizontal and vertical line</li> <li>Some pupils may think that all turns have to be in a clockwise direction</li> </ul>
	Line Clockwise, anticlockwise	
	,	

# Statistics

#### Key concepts (National Curriculum statements) 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.

#### Notes and guidance (non-statutory)

• Pupils record, interpret, collate, organise and compare information (for example, using many-to-one correspondence in pictograms with simple ratios 2, 5, 10).

<ul> <li>Collect information</li> <li>Use pictures to represent information</li> <li>Intergret a pictogram where the symbol represents a multiple of 2 items</li> <li>Construct a pictogram where the symbol represents a multiple of 2 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a pictogram where the symbol represents a multiple of 3 items</li> <li>Construct a</li></ul>

Prerequisite		TM Pagdy to Program		
	NCE	IM – Reddy 10 Flogress		
	interpr quant	<ul> <li>There are 12 boys in class 5. Show this on a pictogram.</li> <li>A shop sold 10 ice lollies on Wednesday. were sold on Monday? How many more lollies were sold on Tuesday that</li> </ul>	k diagrams and simple tables on a graph. More children have brown eyes than green counting the number of objects in each category and so Number of children in Class 5 gris boys <u>Vectoredy</u> <u>1 children</u> <u>1 children</u> an on Wednesday?	n eyes. orting the categories by How many lollies
<ul> <li>Count to and across 100, forwards and backwards, beginning given number</li> <li>Compare the value of numbers</li> <li>Order numbers</li> </ul>	with 0 or 1, or from any	d answer questions about totalling and comparing cate Some children rolled toy cars down a slope How far did the blue car How much further did th additional questions: Which car rolled the furt Make up a question abou Jane made a tally chart How many more gulls than blackbirds did she see? Additional questions: Make up a question comparing the numbers of spa Jane saw? How many fewer thrushes than magpies did she see? Some children were asked to choose their favouri results. Sow many more girls than boys chose the giraffes? How many more boys chose lions than elephants? animal was chosen by the greatest number of children	tegorical data r roll? the green car roll than the red car? thest? but the red car and the ? barrows and blackbirds that thee? rite animal in the zoo. This P 1 $\frac{Corrs Boys}{100 4 9}$ $\frac{Corrs Boys}{100 4 9}$ $\frac$	yellow car.
Reasoning opportunities and probing auestions	Mathematical Lanauao	le	Possible misconceptions	
Show me a tally. And another. And another.	Data		Some pupils may cross off each five when tallying	g, rather than crossing of

<ul> <li>Show me a tally. And another. And another.</li> <li>Kenny thinks that the correct tally for '8' is IMTIII. Do you agree with Kenny? Explain your answer.</li> <li>Always/Sometimes/Never: A symbol in a pictogram represents one unit.</li> <li>NCETM: Statistics Reasoning</li> <li>Data</li> <li>Some pupils may cross off each five when tallying. Pictogram</li> <li>Block diagram</li> <li>Table</li> <li>Category, Categorical data</li> <li>Total</li> <li>Compare</li> </ul>	g, rather than crossing of
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