

Primary Mathematics Scheme of Work: Stage 2

Unit	Lessons			Key 'Build a Mathematician' (BAM) Indicators	Essential knowledge
	Autumn	Spring	Summer		
Numbers and the number system	10	--	--	<ul style="list-style-type: none"> Read and write numbers up to 100 in numerals and in words Compare and order whole numbers up to 100 Count from zero in multiples of 2, 3 and 5 Count in tens from any number, forwards and backwards Add and subtract numbers including a two-digit number and ones, a two-digit number and tens, two two-digit numbers, and three one-digit numbers Derive addition and subtraction facts to 100 using known facts to 20 Write multiplication and division statements using correct symbols Understand that addition and multiplication of two numbers can be done in any order (commutative) and subtraction and division cannot Recognise and name the fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$ Tell the time to the nearest five minutes using an analogue clock, including 'quarter past' and 'quarter to'. Use a ruler to measure lengths in millimetres and centimetres Identify and describe 2D and 3D shapes Use mathematical vocabulary to describe position, direction and movement 	<ul style="list-style-type: none"> Know the place value headings of ones and tens Know that zero is a placeholder Know the symbols =, <, >, ×, ÷ Know the meaning of odd and even numbers Know doubles and halves up to 20 Know addition and subtraction facts to 20 Know multiplication facts for the 2, 5 and 10 multiplication tables Know division facts related to the 2, 5 and 10 multiplication tables Know that 60 minutes = 1 hour Know that 24 hours = 1 day Know the symbols for pounds (£) and pence (p) Know the standard units for length (m, cm), mass (kg, g), temperature (°C) and capacity (litres/ml) Know the names and number of sides of 2D shapes Known the meaning of 'edges', 'faces' and 'vertices' Know the names and number of faces of 3D shapes
Counting and comparing	5	--	--		
Investigating properties of shapes	10	--	--		
Calculating: addition and subtraction	10	10	5		
Exploring time	10	--	--		
Calculating: multiplication and division	10	10	5		
Exploring fractions	10	--	--		
Mathematical movement	--	10	--		
Measuring space	--	5	5+10		
Exploring money	--	10	--		
Presentation of data	--	--	10		
Preventing the gap / Going deeper					
Total:		145			

Stage 2 BAM Progress Tracker Sheet

w/c 2/9/2019	Numbers and the number system	w/c 4/11/2019	Investigating properties of shapes	w/c 6/1/2020	Calculating: addition and subtraction	w/c 24/2/2020	Calculating: multiplication and division	w/c 20/4/2020	Calculating: addition and subtraction	w/c 1/6/2020	Measuring space
w/c 9/9/2019		w/c 11/11/20		w/c 13/1/202		w/c 2/3/2020		w/c 27/4/2020	Calculating: multiplication and division	w/c 8/6/2020	
w/c 16/9/2019	Counting and comparing	w/c 18/11/2019		w/c 20/1/2020		w/c 9/3/2020	Consolidation	w/c 4/5/2020	Exploring fractions	w/c 15/6/2020	
w/c 23/9/2019		w/c 25/11/2019	Exploring fractions	w/c 27/1/2020	Exploring money	w/c 16/3/2020	Whole School Assessment Week SATs 2019	w/c 11/5/2020	Measuring space	w/c 22/6/2020	Presentation of data
w/c 30/9/2019	Calculating: addition and subtraction	w/c 2/12/2019	Whole School Assessment Week SATs 2017	w/c 3/2/2020	Assessment SATs papers 2018	w/c 23/3/2020	Mathematical movement	w/c 18/5/2020	Key Stage 1 SATs	w/c 29/6/2020	Sorting with Venn Diagrams
w/c 7/10/2019	Assessment SATs papers 2016	w/c 9/12/2019		w/c 10/2/2020	Measuring space	w/c 30/3/2020				w/c 6/7/2020	Consolidation & Getting ready for Year 3
w/c 14/10/2019		w/c 16/12/2019	Exploring time							w/c 13/7/2020	
w/c 21/10/2019	Calculating: multiplication and division									w/c 20/7/2020	





Key concepts (National Curriculum statements)

The Big Picture: [Number and Place Value progression map](#)

- recognise the place value of each digit in a two-digit number (tens, ones)
- read and write numbers to at least 100 in numerals and in words
- use place value and number facts to solve problems
- identify, represent and estimate numbers using different representations, including the number line

Notes and guidance (non-statutory)

- 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.

Continuum References

Band 1 (N-WT)	Band 3 (R-WT)	Band 5 (R-AT)	Band 7 (1-WT)	Band 8 (1-AT)
Shows an awareness of number activities and counting Is aware of cause and effects in familiar mathematical activities <i>e.g. knows that in a role play shop a coin can be exchanged for an item</i> <i>Pupils show awareness of changes in quantity</i>	Demonstrates understanding of 'more' Demonstrates understanding of 1:1 correspondence in range of contexts and counts reliably to 3 Joins in rote counting to 5 Joins in with new number rhymes, songs stories, games	Counts reliably with numbers from one to 20, places them in order Begins to use ordinal numbers (first, second, last) when describing the position of objects Begins to recognise numerals 1-9 and relate them to sets of objects Recognises differences in quantity Estimates a small number and checks by counting Continues counting from a given small number up to 10 Joins in with rote counting beyond 10	Counts, reads, orders and writes numbers to 20 Reads and writes numbers to ten in words Counts in 2's forward and backwards to 20 Counts in 10's to 100 Given a number can identify one more	Counts to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number Counts, reads and writes numbers to 100 in numerals and to 20 in words; counts in multiples of twos, fives and tens Uses the language of: equal to, more than, less than (fewer), most least Identifies and represents numbers using objects and pictorial representations including the number line When given a number (to 100), identifies one more and one less
Band 2 (N-AT)	Band 4 (R-WT)	Band 6 (1-WT)		
Indicates one or two Makes sets that have the same small number of objects in each, Solves simple problems practically eg. checking there is a knife for every fork. Responds to and joins in with familiar number rhymes, stories, songs and games	Counts at least 5 objects reliably Recognises numerals from one to five and to understands that each represents a constant number or amount Joins in rote counting to 10	Counts, reads and writes numbers to 10 Counts in 2's forward and backwards to 10		

Possible themes

- Explore the value of numbers
- Explore where numbers live in our number system
- Solve problems comparing the value of numbers
- Represent numbers in different ways

Possible key learning points

- Explain the value of each digit in a two-digit number
- Read numbers to 100 in numerals and words
- Read numbers to 500 in numerals and words
- Write numbers to 100 in numerals and words
- Write numbers to 500 in numerals and words
- Represent and estimate numbers using a number line
- Compare the value of numbers explaining if they are more/ less than or equal to another number or numbers
- Represent numbers different ways using partitioning

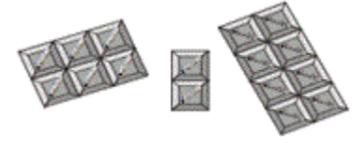
Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> • Read and write numbers from 1 to 20 in numerals and words • Identify and represent numbers using objects and pictorial representations including the number line • Use the language of more than/ less than (fewer), most, least, equal to when comparing the value of numbers 	Place value Digit One-digit Two-digit Three-digit Hundreds, tens, ones (units) Number words to one hundred Estimate Represent Partition Exchange	Pupils need to understand that when counting in our number system we count objects into groups of ten and then groups of one hundred, one thousand etc.. NCETM: Glossary Common approaches <i>Numerals to 100 and beyond – It would help to use three different consistent colours to represent the notation of the hundreds, tens and units digits so that the pupils understand that they read the left (or red) digit first etc. When counting objects pupils should be encouraged to count into groups of ten and then to discuss whether they have enough objects to make another group of ten or whether they have some 'ones/units' left over.</i>

Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> • Show me a number that has more/ less tens/units than this number. And Another. And Another. • Convince me that 53 is less than 58 • Kenny says that 67 is greater than 97. Is he correct? • What is the same and what is different about these two numbers: 16 and 61? • Always/Sometimes/Never: A number with 7 in the units will always be greater than a number with 5 in the units? NCETM: Place Value Reasoning	KM: Practical counting activities where pupils are encouraged to support with everyday problems (i.e. counting out and labeling the correct number the of milk cartons, the dinner money, the register for each class etc.) KM: Partitioning patterns: Partition numbers systematically using practical apparatus into multiples of ten and units. For example, How many ways can you partition 53 into different multiples of ten? How do you know that you have found all the ways? KM: Three in a row NRICH: Two-digit Targets NRICH: Largest Even NRICH: Number Detective NRICH: A story about absolutely nothing Learning review KM: 2M1 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)	<ul style="list-style-type: none"> • Some pupils may muddle the 'teen' and the 'ty' numbers • Some pupils may read the units digit before the tens or hundreds digits. • Some pupils may record numbers incorrectly (for example one hundred and twenty-three as 10023) • 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)

Concrete	Pictorial	Abstract



PUMA assessment criteria		NCETM – Exemplification	
Autumn	Spring	Summer	
<p>recognise the place value of each digit in a two-digit number (tens, ones)</p> <p>identify, represent and estimate numbers using different representations, including the number line</p> <p>read and begin to write numbers to at least 100 in numerals and in words e.g. forty</p> <p>compare and order numbers from 0 up to 100</p> <p>use place value and number facts to solve problems</p>	<p>recognise the place value of each digit in a two-digit number (tens, ones)</p> <p>identify, represent and estimate numbers using different representations, including the number line</p> <p>read and write numbers to at least 100 in numerals and in words e.g. forty-five</p> <p>use place value and number facts to solve problems.</p> <p>partition numbers in different ways e.g. $23 = 20 + 3 = 10 + 13$</p>	<p>recognise the place value of each digit in a two-digit number (tens, ones)</p> <p>identify, represent and estimate numbers using different representations, including the number line</p> <p>read and write numbers to at least 100 in numerals and in words</p> <p>use place value and number facts to solve problems.</p> <p>partition numbers in different ways e.g. $23 = 20 + 3 = 10 + 13$</p>	<p>recognise the place value of each digit in a two-digit number (tens, ones)</p> <ul style="list-style-type: none"> Look at these numbers. 37 12 45 60 72 27 Which of these numbers is the largest? Which of these numbers is between 10 and 20? What is the value of ... ? (point to digits in the list above) <p>identify, represent and estimate numbers using different representations, including the number line</p> <ul style="list-style-type: none"> Children should be able to represent numbers using equipment such as bundles of ten and single art-straws, 10p and 1p coins and number lines. Look at the squares of chocolate There are 16 squares <p>Tick(✓) the sum that matches the picture</p> <ul style="list-style-type: none"> <input type="radio"/> $5+2+9=16$ <input type="radio"/> $5+6+5=16$ <input type="radio"/> $6+6+4=16$ <input type="radio"/> $6+2+8=16$ <input type="radio"/> $8+3+5=16$ <p>read and write numbers to at least 100 in numerals and in words</p> <ul style="list-style-type: none"> Children should be able to answer questions, such as: What numbers can you make using two of these digits: 3, 6, 0? Write down each number you make. Read those numbers to me. Can you write the largest of the numbers in words?



Key concepts (National Curriculum statements)

The Big Picture: [Number and Place Value progression map](#)

- compare and order numbers from 0 up to 100; use <, > and = signs
- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward

Notes and guidance (non-statutory)

- 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.

Continuum References

Band 1 (N-WT)	Band 3 (R-WT)	Band 5 (R-AT)	Band 7 (1-WT)	Band 8 (1-AT)
Shows an awareness of number activities and counting Is aware of cause and effects in familiar mathematical activities <i>e.g. knows that in a role play shop a coin can be exchanged for an item</i> <i>Pupils show awareness of changes in quantity</i>	Demonstrates understanding of 'more' Demonstrates understanding of 1:1 correspondence in range of contexts and counts reliably to 3 Joins in rote counting to 5 Joins in with new number rhymes, songs stories, games	Counts reliably with numbers from one to 20, places them in order Begins to use ordinal numbers (first, second, last) when describing the position of objects Begins to recognise numerals 1-9 and relate them to sets of objects Recognises differences in quantity Estimates a small number and checks by counting Continues counting from a given small number up to 10 Joins in with rote counting beyond 10	Counts, reads, orders and writes numbers to 20 Reads and writes numbers to ten in words Counts in 2's forward and backwards to 20 Counts in 10's to 100 Given a number can identify one more	Counts to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number Counts, reads and writes numbers to 100 in numerals and to 20 in words; counts in multiples of twos, fives and tens Uses the language of: equal to, more than, less than (fewer), most least Identifies and represents numbers using objects and pictorial representations including the number line When given a number (to 100), identifies one more and one less
Band 2 (N-AT)	Band 4 (R-WT)	Band 6 (1-WT)		
Indicates one or two Makes sets that have the same small number of objects in each, Solves simple problems practically eg. checking there is a knife for every fork. Responds to and joins in with familiar number rhymes, stories, songs and games	Counts at least 5 objects reliably Recognises numerals from one to five and to understands that each represents a constant number or amount Joins in rote counting to 10	Counts, reads and writes numbers to 10 Counts in 2's forward and backwards to 10		

Possible themes

- Solve problems comparing the value of numbers
- Order numbers according to their value
- Investigate number patterns

Possible key learning points

- Order numbers (0 to up to 100) from lowest to greatest value and vice versa
- Use = symbol
- Use < symbol when comparing numbers from 0 up to 100
- Use > symbol when comparing numbers from 0 up to 100
- Count on and back in steps of 2 from 0
- Count on and back in steps of 3 from 0
- Count on and back in steps of 5 from 0
- Count on and back in tens from any number

Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> • Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • Count in multiples of twos, fives and tens • Can order numbers to 20 accurately • Understand how a number line and number grid is organised 	Greater than / Less than, Greatest / Least Value Order Steps Multiple (of) Tens Digits Pattern Sequence Count on/ back Forward/ backward Predict Rule Notation: <, > and = signs	It is vital that pupils are supported in identifying and exploring number patterns using visual resources such as the number line, number grid or practical apparatus. Also exploring a systematic approach to exploring patterns (for example starting with the lowest / highest number first can help them to see patterns more clearly.) Rather than telling the pupils that a number is a specific multiple, encourage them to spot patterns and to generalize. Questions such as 'What do you notice?' or why would/ wouldn't this number be in this pattern will help the pupils to internalise their understanding. NCETM: Glossary Common approaches <i>When using the greater than and less than signs ensure that you teach the pupils to read the number sentence from left to right. It might also be beneficial to add actions to help the pupils to remember what each sign represents.</i>

Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> • Kenny thinks 17 is a multiple of 3. Do you agree with Kenny? • Jenny thinks that all multiples of 2 are even numbers. Do you agree with Jenny? • Benny says that the multiples of 3 will make a diagonal pattern on the number grid. Is he correct? • Show me a number that is < 100. And Another. And Another. • Show me a number with 3 in the units that is less than 50 but greater than 25. And Another. And Another. • Convince me that 67 will not be in this sequence: 5,10,15,20 • Lenny starts at 94 and counts back in tens. He thinks that he will land on the number 49. Is he correct? • Using the following 6 digits, (5,7,8,2,1,9) can you make three two-digit numbers with the greatest/ lowest value? What do you notice? NCETM: Place Value Reasoning	KM: Pattern spotting: Use practical apparatus alongside the number line or number grid to explore patterns. Encourage pupils to discuss what they notice and what they expect the pattern to look like if continued. Ask them to consider whether larger numbers would or would not fall in the pattern and explain their reasoning. KM: Dice, dominoes, practical apparatus: Create, build and order numbers according to their value. Support through the use of the number line or number grid. KM: Equals Sign Base Board NRICH: The Thousands Game NRICH: Four-digit Targets Learning review KM: 2M2 BAM Task , 2M3 BAM Task , 2M4 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)	<ul style="list-style-type: none"> • Pupils may think that all numbers ending in 3 are multiples of 3 • Pupils may not spot patterns because they are not secure in the stable order of our number system • Pupils may not understand that the position of the digits in a number represents the value • Pupils may misread the greater than > and less than < signs

Concrete	Pictorial	Abstract



PUMA assessment criteria			NCETM – Exemplification
Autumn	Spring	Summer	<p>count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward</p> <ul style="list-style-type: none"> Use their knowledge of counting on from or back to zero in steps of 2, 3, 5 and 10 to answer multiplication and division questions such as 7×2 and $40 \div 5$. They understand that one way to work out $40 \div 5$, for example, is to find out how many fives make 40. They know that this can be done by counting forwards in fives from zero or backwards in fives from 40. Write the missing numbers in each of these patterns. <p>count in steps of 2</p>  <p>count in steps of 5</p>  <p>compare and order numbers from 0 up to 100; use $<$, $>$ and $=$ signs</p> <ul style="list-style-type: none"> Here are two signs Use these signs to make these correct <ul style="list-style-type: none"> $52 \square 17$ $18 \square 91$ $50 \square 34$ Children should be able to order a set of two-digit numbers, such as 52, 25, 5, 22, 2, 55. They explain their decisions. They understand and use the $<$ and $>$ symbols; for example, they write a two-digit number to make the statement $56 > \square$ true.
<p>count in steps of 2 and 5 from 0, and tens from any number, forward or backward e.g. 93, 83, 73, 63, ...</p> <p>compare and order numbers from 0 up to 100</p> <p>use place value and number facts to solve problems</p>	<p>count in steps of 2, 3, and 5 from 0, and tens from any number, forward or backward</p> <p>compare and order numbers from 0 up to 100; use $<$, $>$ and $=$ signs</p> <p>use place value and number facts to solve problems.</p> <p>partition numbers in different ways e.g. $23 = 20 + 3 = 10 + 13$</p>	<p>count in steps of 2, 3, and 5 from 0, and tens from any number, forward or backward</p> <p>compare and order numbers from 0 up to 100; use $<$, $>$ and $=$ signs</p> <p>use place value and number facts to solve problems.</p> <p>partition numbers in different ways e.g. $23 = 20 + 3 = 10 + 13$</p>	
<p>compare and order numbers from 0 up to 100; use $<$, $>$ and $=$ signs</p> <p>use place value and number facts to solve problems.</p> <p>partition numbers in different ways e.g. $23 = 20 + 3 = 10 + 13$</p>	<p>compare and order numbers from 0 up to 100; use $<$, $>$ and $=$ signs</p> <p>use place value and number facts to solve problems.</p> <p>partition numbers in different ways e.g. $23 = 20 + 3 = 10 + 13$</p>	<p>compare and order numbers from 0 up to 100; use $<$, $>$ and $=$ signs</p> <p>use place value and number facts to solve problems.</p> <p>partition numbers in different ways e.g. $23 = 20 + 3 = 10 + 13$</p>	



Key concepts (National Curriculum statements)

The Big Picture: [Properties of Shape progression map](#)

- identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] SPRING
- identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line AUTUMN
- compare and sort common 2-D and 3-D shapes and everyday objects AUTUMN
- identify and describe the properties of 3-D shapes, including the number of edges (SPRING), vertices and faces (AUTUMN)

Notes and guidance (non-statutory)

- 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.

Continuum References

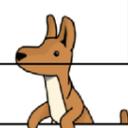
Band 1 (N-WT)	Band 4 (R-WT)	Band 6 (1-WT)	Band 7 (1-WT)	Band 8 (1-AT)
Searches for objects that have gone out of sight, hearing or touch Demonstrates interest in position and the relationship between objects.	Picks out described shapes from a collection, Completes classification activities using a given criterion Identifies when an object is different and does not belong to a given familiar category,	Sorts and matches simple shapes using mathematical language and own criteria Constructs models using 3-D shapes Recognises, continues and devises simple repeating patterns	Identifies and name rectangles, triangles and circles in familiar contexts. Selects simple 3-D shapes Describes position using everyday language eg. on, under, next to Recognises and creates simple repeating patterns with objects and shapes (simple repeat RGBRGB)	Recognises and name common 2-D and 3-D shapes
Band 2 (N-AT)	Band 5 (R-AT)			
Sorts or matches objects or pictures by recognising similarities	Responds to mathematical vocabulary such as 'straight', 'circle', 'larger' to describe the shape and size of solids and flat shapes, Talks about, recognises and copies simple repeating patterns and sequence.			
Band 3 (R-WT)				
Manipulates three-dimensional shapes,				

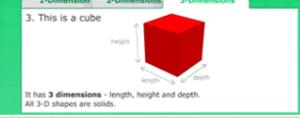
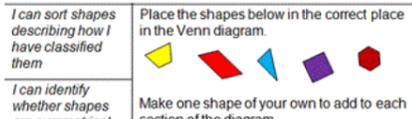
Possible themes	Possible key learning points
<ul style="list-style-type: none"> • Explore 2 –D shapes • Explore 3 –D shapes • Compare 2-D and 3-D shapes 	<ul style="list-style-type: none"> • Identify and describe the properties of pentagons • Identify and describe the properties of hexagons • Identify and describe the properties of octagons • Identify symmetry properties of 2-D shapes using vertical lines • Compare and sort 2-D shapes • Identify and describe 2-D shapes on the surface of 3-D shapes • Identify and describe the properties of 3-D shapes including the number of edges • Identify and describe the properties of 3-D shapes including the number of vertices • Identify and describe the properties of cylinders • Identify and describe the properties of cones • Compare and sort 3-D shapes

Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> • 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 	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	Note that a square is a rectangle but a rectangle is not necessarily a square. Pupils may also know names of other polygons such as pentagon (5 sides), hexagon (6 sides), heptagon (7 sides), octagon (8 sides), nonagon (9 sides), decagon (10 sides) and dodecagon (12 sides). Most sets of shapes that are available to buy represent shapes often in their regular form. Be careful not to only present shapes in a regular form or in a specific orientation as this could lead to possible misconceptions. Ensure that pupils understand that line symmetry is where you can draw a line of symmetry (mirror line) across a shape or picture and both sides of the line are identical (a mirror image). NCETM: Glossary Common approaches <i>Make sure that pupils refer to the properties of 3-D shapes as edges, vertices and faces and 2-D shapes as sides and corners.</i> <i>Every classroom displays shapes in different orientations.</i> <i>Every classroom displays regular and irregular hexagons, pentagons, octagons and decagons</i>

Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> • Look at the shapes in front of you...What can you tell me about the shapes? • Show me a shape with four sides. And Another. And Another. • Convince me that this is a square is a rectangle. • Always/Sometimes/Never: A shape with 4 straight sides is a square. • Always/Sometimes/Never: A pyramid has one square face • Kenny says that a circle has one vertical line of symmetry. Is he correct? NCETM: Geometry - Properties of Shapes Reasoning	KM: Barrier Games KM: Can I come to the party? NRICH: Take a ... Geoboard NRICH: Properties of Shapes KS1 NRICH: Stringy Quads NRICH: Let us reflect Learning review KM: 2M12 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)	<ul style="list-style-type: none"> • Some pupils may think that a rectangle and square are the same shape. • Some pupils may think that a cuboid and cube are the same solid. • 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) • Some pupils may only recognise shapes when they are in a specific (often horizontal orientation) • Some pupils think that all hexagons, pentagons, octagons and decagons are regular

Concrete	Pictorial	Abstract



PUMA assessment criteria		NCETM – Exemplification																
Autumn	Spring	Summer																
<p>identify and describe the properties of 2-D shapes, including the number of sides and symmetry in a vertical line</p> <p>identify and describe the properties of 3-D shapes, including the number of vertices and faces</p> <p>compare and sort common 2-D and 3-D shapes and everyday objects</p> <p>e.g. sort 3-D shapes in different ways such as whether they have triangular faces, all straight edges...</p> <p>draw lines and shapes using a straight edge</p> <p>recognise and name, polygons e.g. pentagon, hexagon, octagon and cones</p>	<p>identify and describe the properties of 2-D shapes, including the number of sides and symmetry in a vertical line</p> <p>identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces</p> <p>compare and sort common 2-D and 3-D shapes and everyday objects e.g. sort 3-D shapes in different ways such as whether they are prisms, whether they have more than 8 edges...</p> <p>identify 2-D shapes on the surface of 3-D shapes, for example a circle on a cylinder and a triangle on a pyramid</p> <p>draw lines and shapes using a straight edge</p> <p>recognise and name quadrilaterals, polygons e.g. pentagon, hexagon, octagon, prisms and cones</p>	<p>identify and describe the properties of 2-D shapes, including the number of sides and symmetry in a vertical line</p> <p>identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces</p> <p>compare and sort common 2-D and 3-D shapes and everyday objects e.g. sort 2-D shapes in different ways such as whether they are quadrilaterals and have line symmetry....</p> <p>identify 2-D shapes on the surface of 3-D shapes, for example a circle on a cylinder and a triangle on a pyramid</p> <p>draw lines and shapes using a straight edge</p> <p>recognise and name quadrilaterals, polygons e.g. pentagon, hexagon, octagon, prisms and cones</p>																
		<p>identify and describe the properties of 2-D shapes, including the number of sides and symmetry in a vertical line</p> <p>identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces</p> <p>Write the missing numbers in the 2 empty boxes.</p> <table border="1"> <thead> <tr> <th></th> <th>number of square faces</th> <th>number of triangular faces</th> <th>number of circular faces</th> </tr> </thead> <tbody> <tr> <td>cylinder </td> <td>0</td> <td>0</td> <td></td> </tr> <tr> <td>cube </td> <td></td> <td>0</td> <td>0</td> </tr> <tr> <td>pyramid </td> <td>1</td> <td>4</td> <td>0</td> </tr> </tbody> </table> <p>identify 2-D shapes on the surface of 3-D shapes, for example a circle on a cylinder and a triangle on a pyramid</p> <p>What is a 3-D shape? <small>It has 3 dimensions – length, height and depth. All 3-D shapes are solids.</small></p>  <p>3. This is a cube</p> <p>1-Dimension 2-Dimensions 3-Dimensions</p> <p>compare and sort common 2-D and 3-D shapes and everyday objects.</p> <p><i>I can sort shapes describing how I have classified them</i></p> <p><i>I can identify whether shapes are symmetrical</i></p> <p>Place the shapes below in the correct place in the Venn diagram.</p>  <p>Make one shape of your own to add to each section of the diagram.</p> <p>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'</p>		number of square faces	number of triangular faces	number of circular faces	cylinder 	0	0		cube 		0	0	pyramid 	1	4	0
	number of square faces	number of triangular faces	number of circular faces															
cylinder 	0	0																
cube 		0	0															
pyramid 	1	4	0															



Key concepts (National Curriculum statements)

The Big Picture: [Calculation progression map](#)

- 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 (SPRING)
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems (SPRING)
- 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

Notes and guidance (non-statutory)

- 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.

Continuum References

Band 1 (N-WT)	Band 4 (R-WT)	Band 6 (1-WT)	Band 7 (1-WT)	Band 8 (1-AT)
Shows an awareness of number activities and counting Is aware of cause and effects in familiar mathematical activities e.g. <i>knows that in a role play shop a coin can be exchanged for an item</i> <i>Pupils show awareness of changes in quantity</i>	In practical situations responds to 'add one' to a number of objects - Responds to requests such as add one pencil to the pencils in the pot, add one sweet to the dish In practical situations responds to 'add one' to or 'take one away' from a number of objects - Using objects placed on or people standing on a number track, adds or removes object and says, signs or indicates how many	Add numbers when solving problems involving 10 objects including problems with money and measures Begins to recognise that addition can be done in any order Understands the position of the largest number Uses a numberline to count on to solve numerical addition problems to 10 Uses a numberline to count back to solve subtraction problems to 10 Begins to understand that subtraction must be completed in order Begins to recognise that the largest number is always last and the largest number must go first	Understands the operation and language of addition: Uses mental recall of addition facts to 10 Can complete 'missing' number sums to 10 Can make sums to total numbers to 10 Understands the operation and language of subtraction Uses mental recall of subtraction facts to 10 Solves problems involving subtraction including finding the numerical difference between two sets including money and measures	Represents and uses number bonds and related subtraction facts within 20 Adds and subtracts one-digit and two-digit numbers to 20, including zero Reads, writes and interprets mathematical statements involving addition and equals signs Represents and uses related number bond facts to subtract within 20 Adds and subtracts one-digit and two-digit numbers to 20, including zero Reads, writes and interprets mathematical statements involving subtraction and equals signs
Band 2 (N-AT) Demonstrates awareness of contrasting quantities - Makes 'one' and 'lots' by making groups of one or lots of food items on plates Demonstrates awareness of contrasting quantities	Band 5 (R-AT) Says which number is one more than a given number Using quantities and objects, adds two single-digit numbers and counts on to find the answer Says which number is one less than a given number Using quantities and objects, subtracts two single-digit numbers and counts back to find the answer			
Band 3 (R-WT) Demonstrates understanding of 'more' - Asks for 'more' e.g. cups, food items as required Demonstrates an understanding of 'less' - Indicates which bottle has less water in it				

Possible themes	Possible key learning points
<ul style="list-style-type: none"> • Explore addition and subtraction facts • Explore mental strategies to solve calculations • Use the inverse relationship between addition and subtraction • Solve problems addition or subtraction 	<ul style="list-style-type: none"> • Recall and use addition facts within 20 • Derive addition facts within 100 • Understand why addition is commutative • Add a two-digit number and ones using concrete objects, pictorial representations, and mentally • Add a two-digit number and tens using concrete objects, pictorial representations, and mentally • Add two two-digit numbers using concrete objects, pictorial representations, and mentally • Add three one-digit numbers using concrete objects, pictorial representations, and mentally • Recall and use subtraction facts within 20 • Derive subtraction facts within 100 • Understand why subtraction is not commutative • Subtract ones from a two-digit number using concrete objects, pictorial representations, and mentally • Subtract tens from a two-digit number using concrete objects, pictorial representations, and mentally • Subtract two two-digit number using concrete objects, pictorial representations, and mentally • Solve problems involving addition or subtraction using concrete objects and pictorial representations • Solve missing number problems • Check calculations using the correct inverse operation

Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> • Understand the value of digits in two-digit numbers • Interpret a mathematical statement involving the symbols + and = or - and = • Add and subtract one- and two-digit numbers to 20, including 0 	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 boundary	To help develop conceptual understanding concrete apparatus (base-10 equipment, Numicon, etc.) need to be used alongside pictorial representations (an empty number line, partitioning, etc.) Model each of the possible strategies during the unit and create a 'toolkit' (bank of examples) that the pupils can refer to. KM: Progression: Addition and Subtraction and Calculation overview NCETM: Designing a calculation policy , The Bar Model and Subtraction NCETM: Glossary NRICH: Developing Number Fluency - What, Why and How Common approaches To avoid confusion with language, all teachers use 'sum' to refer to calculations that only involve addition. Teachers avoid saying '2 take away 7' is not possible.

Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> • If I know that $13 + 7 = 20$, what else do I know? • Convince me that $36 + 7 = 43$ • Sam says that it doesn't matter which way round you put the numbers when you subtract. Is he correct? • Show me a calculation that is equal to 17. And another. And another. • Show me a subtraction calculation where it is easier to count on (use addition) to find the difference in value. NCETM: Addition and Subtraction Reasoning	KM: Pupils are presented with a range of calculations (some correct/ incorrect) and they have to explain which are correct/ incorrect and why? KM: If I know ... KM: How do you calculate ... ? NRICH: Sums of Pairs , Sort Them Out , Strike it Out for Two NCETM: Activity A , Activity C , Activity D Learning review KM: 2M5 BAM Task , 2M6 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)	<ul style="list-style-type: none"> • Some pupils may include the first number in the count (not count on from) • Some pupils may confuse the language of addition or subtraction, and therefore use the incorrect operation to carry out a calculation • Some children may assume commutativity within subtraction and say '2 take away 7' when they should say '7 take away 2'. • 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.

Concrete	Pictorial	Abstract



PUMA assessment criteria			NCETM – Exemplification
Autumn	Spring	Summer	
<p>add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> o a two-digit number and ones o a two-digit number and tens e.g. $87 - 30 = 57$ <p>solve problems with addition and subtraction:</p> <ul style="list-style-type: none"> o using concrete objects and pictorial representations, including those involving numbers, quantities and measures o applying their increasing knowledge of mental and written methods 	<p>add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> o a two-digit number and ones o a two-digit number and tens o two two-digit numbers e.g. $34 + 29$ o adding three one-digit numbers e.g. $6 + 5 + 4$ <p>solve problems with addition and subtraction:</p> <ul style="list-style-type: none"> o using concrete objects and pictorial representations, including those involving numbers, quantities and measures o applying their increasing knowledge of mental and written methods 	<p>add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> o a two-digit number and ones o a two-digit number and tens o two two-digit numbers e.g. $63 - 29$ o adding three one-digit numbers e.g. $9 + 7 + 9$ <p>solve problems with addition and subtraction:</p> <ul style="list-style-type: none"> o using concrete objects and pictorial representations, including those involving numbers, quantities and measures o applying their increasing knowledge of mental and written methods 	<p>solve problems with addition and subtraction:</p> <ul style="list-style-type: none"> ➤ 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: $86 - 50 = 80 + 6 - 50 = 80 - 50 + 6 = 30 + 6 = 36$ ➤ Similarly, to find the total number of people on a bus with 14 people on the top deck and 8 below, they might use: $14 + 8 = 14 + 6 + 2 = 20 + 2 = 22$ ➤ 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 $\square \div 2 = 6$ or $85 - \square = 29$. They recognise, for example, that to answer $85 - \square = 29$ they could use the related addition $29 + \square = 85$ ➤ recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 ➤ 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 $60 - \square = 52$ or $35 = 20 + \square$. They make jottings where appropriate to support their thinking. ➤ Answer problems such as: Look at this number sentence: $\square + \square = 20$. What could the two missing numbers be? What else? Can you tell me all the pairs of numbers that make 20? <p>show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot</p> <ul style="list-style-type: none"> ➤ 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. <p>recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems</p> <ul style="list-style-type: none"> ➤ Check their addition and subtraction with a calculation that uses the inverse operation. <ul style="list-style-type: none"> ➤ Answer questions, such as: ➤ Look at this number sentence: $74 - 13 = 61$ ➤ Write three more number sentences using these numbers. How do you know, without calculating, that they are correct? ➤ What addition facts can you use to help you calculate these? $12 - 5$, $19 - 8$ ➤ Explain how the addition facts helped you. ➤ I think of a number, I subtract 19 and the answer is 30. What is my number? How do you know?



Key concepts (National Curriculum statements)The Big Picture: [Measurement and mensuration progression map](#)

- know the number of minutes in an hour and the number of hours in a day.
- 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

Notes and guidance (non-statutory)

- 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 become fluent in telling the time on analogue clocks and recording it.

Continuum References

Band 1 (N-WT)	Band 3 (R-WT)	Band 5 (R-AT)	Band 7 (1-WT)	Band 8 (1-AT)
N/A	N/A	Shows awareness of time, through some familiarity with names of the days of the week and significant times in their day, e.g. bedtime Understands now, next and after	Describes everyday events using the appropriate sequencing language (e.g. before, after, later etc) Chants the days of the week and the months of the year in order and, with support, identify today's date. Tells the time for o'clock and show on the hands of a clock	Sequences events in chronological order using language eg. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening Recognises and uses language relating to dates, including days of the week, weeks, months and years Tells the time to the hour and half past the hour and draw the hands on a clock face to show these times.
Band 2 (N-AT)	Band 4 (R-WT)			
N/A	N/A	Band 6 (1-WT) Recognises the order of events in the school day using visual images		

Possible themes

- Explore the relationship between units of time
- Explore ways of recording time
- Compare and sequence intervals of time

Possible key learning points

- Know that there are 60 minutes in one hour
- Know that there are 24 hours in one day
- Tell the time using quarter past/to the hour on an analogue clock
- Write the time using quarter past/to the hour on an analogue clock
- Tell the time to five minute intervals on an analogue clock
- Write the time to five minute intervals on an analogue clock
- Draw the hands on a clock face to show times to five minutes, including quarter past/to the hour
- Compare and order a selection of times from earliest to latest or vice versa

Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> • Read the time to the hour and half past • Draw the hands on a clock face to show the time to the hour or half past • Know the meaning of before, after, next, first, today, yesterday, tomorrow, morning, afternoon, evening and o'clock 	Time Hour, minute, second Day o'clock Half past Quarter to, quarter past Clock Hands Analogue Interval Notation A colon is used to separate hours and minutes when writing the time	Construct/annotate a clock face to show that it actually represents two different scales. The minute scale (and hand) could be represented in one colour and the hour scale (and hand) in a different colour. Provide as many opportunities as possible throughout the day (and year) for pupils to practice reading or setting the time. It is helpful to construct a shared toolkit of key facts related to the relationships between units of time. This could be a class toolkit displayed for all to see or could also be in the form of a maths mat or bookmark constructed by the pupils to help them remember key facts. When comparing or sequencing times pupils should assume that the given times are within the same day. The notation of a.m. and p.m. is not introduced until Stage 3 so they should also assume that the given times are within the same morning or afternoon. NCETM: Glossary Common approaches <i>Every classroom has a set of geared mini-clocks and a larger teacher version. The classroom clock has labels for quarter past, half past and quarter to.</i>

Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> • 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. • 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. • Show me a time where the minute hand is past the hour hand. And another, and another... • Show me a pair of times with a difference of 15 minutes. And another, and another... NCETM: Measurement Reasoning	KM: Build and explore a clock NRICH: What Is the Time? NRICH: Two Clocks NCETM: Activity D (Telling the time ITP) Learning review KM: 2M10 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)	<ul style="list-style-type: none"> • 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. • 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. • Some pupils may decimalise time and incorrectly use 100 seconds = 1 minute or 100 minutes = 1 hour

Concrete	Pictorial	Abstract



PUMA assessment criteria		NCETM – Exemplification	
Autumn	Spring	Summer	
compare and sequence intervals of time	compare and sequence intervals of time	compare and sequence intervals of time	<p>compare and sequence intervals of time</p> <ul style="list-style-type: none"> ➤ 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.  <ul style="list-style-type: none"> ➤ What time does this clock show? ➤ Draw a clock showing the time five minutes later. ➤ Show your school day on clock faces: when do you leave home, have breaks, go back home, etc.?



PUMA assessment criteria		NCETM – Exemplification	
Autumn	Spring	Summer	
<p>solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts e.g. share 18 counters between 3 children</p>	<p>solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts</p>	<p>solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts e.g. there are 10 pencils in a box, I have 5 boxes and 3 spare pencils, how many do I have altogether?</p>	<p>recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers</p> <ul style="list-style-type: none"> ➤ The children should be able to: <ul style="list-style-type: none"> ○ 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. ○ e.g. $2 \times 5 = 10$, show me three more number facts using these numbers. ○ Is 34 an odd number? How do you know? <p>calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals signs</p> <ul style="list-style-type: none"> ➤ Children should be able to: <ul style="list-style-type: none"> ○ Find missing numbers or symbols in a calculation: $4 \times _ = 20$, $_ \div 10 = 3$ ○ Anna has 3 boxes of cakes. Each box contains 5 cakes. How many cakes does she have altogether? Show how you worked this out. <p>show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot</p> <ul style="list-style-type: none"> ➤ Children should be able to: <ul style="list-style-type: none"> ○ Use their knowledge of triangles of numbers to show related number facts. e.g. If $6 \times 2 = 12$ then $2 \times 6 = 12$ and $12 \div 6 = 2$. <p>solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts</p> <ul style="list-style-type: none"> ➤ Children should be able to: <ul style="list-style-type: none"> ○ Use various methods and apparatus to help them solve word problems such as: ○ 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.



Key concepts (National Curriculum statements)

The Big Picture: [Fractions, decimals and percentages progression map](#)

- recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ 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 $\frac{1}{2}$

Notes and guidance (non-statutory)

- 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 $\frac{1}{2}$ and $\frac{2}{4}$ equivalence on the number line (for example, $1\frac{1}{4}$, $1\frac{2}{4}$ (or $1\frac{1}{2}$), $1\frac{3}{4}$, 2). This reinforces the concept of fractions as numbers and that they can add up to more than 1.

Continuum References

Band 1 (N-WT)	Band 4 (R-WT)	Band 6 (1-WT)	Band 7 (1-WT)	Band 8 (1-AT)
N/A	N/A	Uses the concept and language of half / halves in practical situations eg. can give out 10 counters into 2 groups and recognises that 5 + 5 is fair and represents half equally	Uses the concept and language of quarter / quarters in practical situations eg. can group 12 counters into four equal groups	Recognises, finds and names a half as one of two equal parts of an object, shape or quantity. Recognises, finds and names a quarter as one of four equal parts of an object, shape or quantity.
Band 2 (N-AT)	Band 5 (R-AT)			
N/A	Solves practical problems, involving the vocabulary and concepts of doubling, halving and sharing			
Band 3 (R-WT)				
N/A				

Possible themes

- Explore fractions

Possible key learning points

- Recognise one quarter as one of four equal parts of an object, shape or quantity and use fraction notation
- Recognise two quarters as two of four equal parts, or two of one quarter, of an object, shape or quantity and use fraction notation
- 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
- Recognise one third as one of three equal parts of an object, shape or quantity and use fraction notation
- Find one quarter of an object, shape or set of objects
- Find two quarters of an object, shape or set of objects
- Find three quarters of an object, shape or set of objects
- Find one third of an object, shape or set of objects
- Recognise that a half is equivalent to two quarters
- Write simple fraction statements involving the fraction $\frac{1}{2}$ such as $\frac{1}{2}$ of 6 = 3
- Write simple fraction statements involving the fractions $\frac{1}{4}$, $\frac{2}{4}$ or $\frac{3}{4}$, such as $\frac{1}{4}$ of 8 = 2
- Write simple fraction statements involving the fractions $\frac{1}{3}$ such as $\frac{1}{3}$ of 6 = 2

Prerequisites

- Recognise a half as one of two equal parts of an object, shape or quantity
- Recognise a quarter as one of four equal parts of an object, shape or quantity

Mathematical language

Part
Equal
Whole
Half, halves
Quarter, three quarters
Third
Equivalent
Fraction
Numerator
Denominator
Unit fraction, non-unit fraction

Notation
Horizontal bar for fractions
Diagonal bar for fractions

Pedagogical notes

In these early stages fractions are developed as proportions of an amount. In future, pupils see that fractions can also be numbers in their own right. There is a difference between using a fraction as an adjective to describe a representative amount of an object (for example ‘this is $\frac{3}{4}$ of this square’) or as a verb where the fraction is used to describe an action (for example ‘I am finding $\frac{3}{4}$ of 8’). The first involves partitioning and identifying the fraction; the second involves use of multiplication or division facts to find the fractional amount. Children need opportunities to explore practically fractions of lengths / objects and shapes and then to make the links to representation of what they have found.
NCETM: [Teaching fractions](#)
NCETM: [Glossary](#)

Common approaches
Pupils are expected to use horizontal bar notation for fractions

Reasoning opportunities and probing questions

- Show me $\frac{1}{2}$ of an amount. And another, and another ...
- True or false:
 - $\frac{3}{4}$ is greater than $\frac{1}{2}$ because it has a 4 at the bottom and that is a bigger number
 - You can only find one half of even numbers
 - One quarter of 20 is smaller than $\frac{1}{2}$ of 10
 - Three quarters of an amount is larger than one half of an amount
- Which is the odd one out and why: $\frac{1}{2}$, $\frac{1}{4}$, $\frac{2}{4}$?

Suggested activities

KM: [To quarter or not quarter](#)
KM: [Fraction flag](#)
NRICH: [Early Fraction Development](#)
NCETM: [Activity B](#)
NCETM: [Activity C](#)
NCETM: [Activity D](#)

Learning review
KM: [2M9 BAM Task](#)
NCETM: [NC Assessment Materials \(Teaching and Assessing Mastery\)](#)

Possible misconceptions

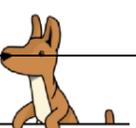
- Some pupils may not understand that when splitting one whole into a fractional amount, each part must be equal
- Some pupils may think that to find $\frac{3}{4}$ you split into 4 and then each of those parts into 3
- Some pupils may think that a quarter is a larger piece than a third since 4 is greater 3
- Some pupils may not appreciate that when shading a fraction of a shape, the position of the shaded section can vary

NCETM: [Fractions Reasoning](#)

Concrete

Pictorial

Abstract



PUMA assessment criteria			NCETM – Exemplification
Autumn	Spring	Summer	<p>recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity</p> <ul style="list-style-type: none"> Using bar models to represent and unpick a fraction word problem <div style="display: flex; align-items: center;"> <div style="display: flex; gap: 5px;"> <div style="border: 1px solid black; padding: 2px;">Sam's Age</div> <div style="border: 1px solid black; padding: 2px;">Sam's Age</div> <div style="border: 1px solid black; padding: 2px;">2</div> </div> <div style="margin-left: 20px;"> <p>Harrison and sam were talking and Harrison said that if he doubled Sam's age and added 2 he would get 12</p> </div> </div> <div style="margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">12 years</div> </div> <ul style="list-style-type: none"> write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$ Would a chocolate lover rather have $\frac{1}{2}$ or $\frac{3}{5}$ of this bar of chocolate? Explain your answer. <div style="text-align: center; margin-top: 10px;">  </div>
recognise, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a shape	<p>recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity e.g. how long is $\frac{1}{3}$ of a ribbon which is 60 cm long?</p> <p>write simple fractions e.g. $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of two quarters and one half.</p>	<p>recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity</p> <p>write simple fractions e.g. $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of two quarters and one half</p>	



Key concepts (National Curriculum statements)

The Big Picture: [Position and direction progression map](#)

- 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 anti-clockwise)
- order and arrange combinations of mathematical objects in patterns and sequences

Notes and guidance (non-statutory)

- 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).

Continuum References

Band 1 (N-WT)	Band 4 (R-WT)	Band 6 (1-WT)	Band 7 (1-WT)	Band 8 (1-AT)
Searches for objects that have gone out of sight, hearing or touch	Responds to 'forwards' and 'backwards'		Describes position using everyday language eg. on, under, next to Follows instructions from another including the turns either left or right, quarter turns either clockwise or anti-clockwise, referring to a clock face to establish the direction, with prompts.	Describes position using everyday language e.g. top, middle, bottom, in front of, between, near, inside Describes direction and movement, including whole, half, quarter and three-quarter turns. Gives instructions to another including the turns either left or right, quarter turns either clockwise or anti-clockwise, referring to a clock face to establish the direction.
Band 2 (N-AT)	Band 5 (R-AT)			
Searches intentionally for objects in their usual place, Explores the position of objects,				
Band 3 (R-WT)				
Searches for objects not found in their usual place demonstrating their understanding of object permanence, Shows understanding of words signs and symbols that describe positions				

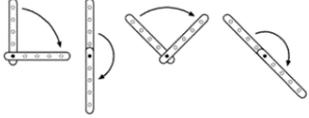
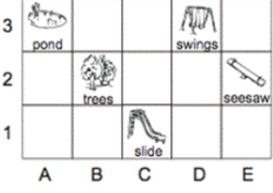
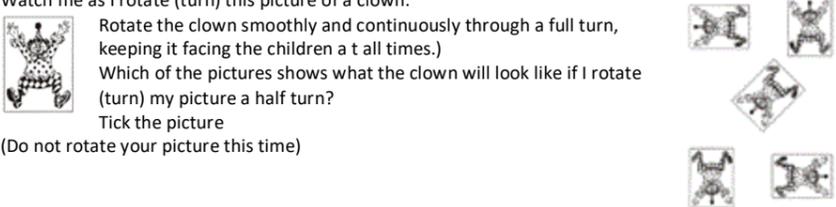
Possible themes	Possible key learning points
<ul style="list-style-type: none"> • Investigate mathematical language to describe movement 	<ul style="list-style-type: none"> • Use mathematical language to describe position • Use mathematical language to describe movement along a straight line • Use mathematical language to describe direction of a turn, including meaning of clockwise and anti-clockwise • Understand and use the language of right angles to describe the size of turn • Interpret instructions for following a simple route • Devise instructions for following a simple route • Order combinations of mathematical objects in patterns and sequences • Arrange combinations of mathematical objects in patterns and sequences

Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> • Describe position using language such as 'behind', 'next to', 'on top of' and 'between' • Describe position, direction and movement, including whole, half, quarter and three-quarter turns • Connect moving clockwise with movement on a clock face 	Forwards, Backwards Left, Right Angle Right angle Turn Quarter, Half, Three quarters Rotation Position Direction Straight Line Clockwise, anticlockwise	Pupils experience following instructions, devising and stating instructions for other pupils to follow and programming a robot with instructions. This unit is an ideal opportunity to introduce the four points of the compass. Understanding degrees as a way of measuring angles is not introduced until Stage 5. It is thought that the origin of the name 'right angle' is the Latin word for 'upright'; as in perpendicular to the horizontal base in architectural contexts. NCETM: Glossary Common approaches <i>All pupils experience the 'feel' of a right angle by turning through quarter turns</i>

Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> • Show me a quarter turn. An another, and another ... • Always / Sometimes / Never: you need to know the direction of turn if you are asked to turn through two right angles • Kenny says, 'A turn of four right angles is the same as doing nothing at all'. Do you agree with Kenny? Explain why. NCETM: Geometry: Position Direction and Movement Reasoning	KM: Stick on the Maths SSM4: Angle measure NRICH: Turning Man NRICH: Walking Round a Triangle NRICH: Poly Plug Pattern NRICH: Triple Cubes NRICH: A City of Towers NRICH: Caterpillars NRICH: Repeating Patterns NCETM: Activity A NCETM: Activity B Learning review KM: 2M13 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)	<ul style="list-style-type: none"> • Some pupils may think that right angles have to look like this:  • Some pupils may think that right angles have to be created from a horizontal and vertical line • Some pupils may think that all turns have to be in a clockwise direction

Concrete	Pictorial	Abstract



PJMA assessment criteria		NCETM – Exemplification									
Autumn	Spring	Summer									
<p>order and arrange combinations of mathematical objects in patterns, including those in different orientations e.g. a turning shape, draw the next shape in the pattern</p> 	<p>order and arrange combinations of mathematical objects in patterns, including those in different orientations</p> <p>use mathematical vocabulary to describe position, direction and movement, including distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise), and movement in a straight line.</p> <p>Use the concept and language of angles to describe 'turn' by applying rotations, including in practical contexts (e.g. pupils themselves moving in turns, giving instructions to other pupils to do so, and programming robots using instructions given in right angles)</p>	<p>order and arrange combinations of mathematical objects in patterns, including those in different orientations</p> <p>use mathematical vocabulary to describe position, direction and movement, including distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise), and movement in a straight line.</p> <p>Use the concept and language of angles to describe 'turn' by applying rotations, including in practical contexts (e.g. pupils themselves moving in turns, giving instructions to other pupils to do so, and programming robots using instructions given in right angles)</p>	<p>order and arrange combinations of mathematical objects in patterns</p> <ul style="list-style-type: none"> Describe the patterns in sequences and predict what comes next in the sequence and continue the pattern. <p>use mathematical vocabulary to describe position, direction and movement including distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise), and movement in a straight line</p> <ul style="list-style-type: none"> Recognise whole, half and quarter turns. They describe turns and give and follow instructions to turn. For example, they give instructions to a friend to follow a route around the playground. They make and draw half and quarter turns from the same starting point using, for example, two geostrips. Use the grid to help you complete this table. <table border="1" data-bbox="1417 439 1627 608"> <tr> <td>trees</td> <td>B2</td> </tr> <tr> <td>slide</td> <td></td> </tr> <tr> <td>seesaw</td> <td></td> </tr> <tr> <td></td> <td>A3</td> </tr> </table>   <ul style="list-style-type: none"> Watch me as I rotate (turn) this picture of a clown. <ul style="list-style-type: none"> Rotate the clown smoothly and continuously through a full turn, keeping it facing the children at all times.) Which of the pictures shows what the clown will look like if I rotate (turn) my picture a half turn? Tick the picture (Do not rotate your picture this time)  	trees	B2	slide		seesaw			A3
trees	B2										
slide											
seesaw											
	A3										



Key concepts (National Curriculum statements)	The Big Picture: Measurement and mensuration progression map
<ul style="list-style-type: none"> 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 = 	
<ul style="list-style-type: none"> Non statutory Guidance 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'. 	

Continuum References				
Band 1 (N-WT)	Band 4 (R-WT)	Band 6 (1-WT)	Band 7 (1-WT)	Band 8 (1-AT)
<ul style="list-style-type: none"> Matches big objects and small objects, Anticipates, follow sand joins in familiar activities when given a contextual clue, 	<ul style="list-style-type: none"> Uses familiar words in practical situations when they compare sizes and quantities 	<ul style="list-style-type: none"> Shows which object is longer, shorter etc and use appropriate vocabulary in everyday situations Recognises the order of events in the school day using visual images 	<ul style="list-style-type: none"> Solves problems such as 'Using a balance, compare two boxes to find out which is heavier, heaviest'. Compare two 'snakes' which is longer, longest' 	<ul style="list-style-type: none"> Measures, records, compares, describes and solves practical problems for: lengths and heights, mass/weight, capacity and volume using non-standard measures.
Band 2 (N-AT)	Band 5 (R-AT)			
<ul style="list-style-type: none"> Finds big and small objects on request, Compares the overall size of one object with that of another where there is a marked difference, 	<ul style="list-style-type: none"> Compares objects directly, focusing on one dimension such as length or height and can indicate 'the long one' or 'the tall one' 			
Band 3 (R-WT)				
<ul style="list-style-type: none"> Compares the overall size of one object with that of another where the difference is not great 				

Possible themes	Possible key learning points	
<ul style="list-style-type: none"> Explore the measurement of distance Explore the measurement of mass Explore the measurement of capacity Measure temperature 	<ul style="list-style-type: none"> Choose appropriate units to measure a given length Choose appropriate units to measure a given height Choose appropriate units to measure a given mass Choose appropriate units to measure a given capacity Measure a given distance choosing the appropriate equipment Measure a given mass choosing the appropriate equipment Measure a given capacity choosing the appropriate equipment Measure a given temperature choosing the appropriate equipment 	<ul style="list-style-type: none"> Estimate a given distance Estimate a given mass Estimate a given capacity Compare and order lengths Compare and order masses Compare and order capacities Compare and order temperatures Compare and order measurements using >, < and =

Prerequisites	Mathematical language	Pedagogical notes		
<ul style="list-style-type: none"> Use the language long, short, tall, heavy, light, full, empty, more than, less than, double, half Use a ruler, weighing scale and container to measure length, mass and capacity Know and use the symbols >, < and = 	Unit 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	Thermometer Container, vessel Order, Compare, greater than, less than Notation Abbreviations of units: m, cm, g, kg, l, ml, °C The symbols >, < and =	Pupils are expected to know the units: - metres and centimetres, and their abbreviation - kilograms and grams, and their abbreviations - litres and millilitres, and their abbreviations - degrees Celsius and its abbreviation Teacher modeling is essential in this unit as pupils can appear to be grasping the concepts but may actually be measuring inaccurately.	Wherever possible ensure that the pupils gain practical experience of using different measurements linked to real-life contexts. NCETM: Glossary Common approaches <i>Every classroom has a range of measuring equipment and scales immediately available</i> <i>Every classroom has a sack of sand (25 kg), a bag of sugar (1 kg), a cheque book (1 cheque is 1 gram), a bottle of water (1 litre, and also 1 kg of water) and a teaspoon (5 ml)</i>

Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> Show me something that you would measure in cm. And something else, and something else... Show me how to use this apparatus / read this scale Lenny says 'Tall containers always have a greater capacity than shorter ones' Do you agree? True or false: 'I should measure the length of my little finger in m'; 'I should measure the weight of this parcel in ml' NCETM: Measurement Reasoning	KM: Measures In Action KM: Posting a letter/parcel: explore the sizes of letters and parcels allowed by the Post Office NRICH: Order, Order!, Oh! Harry!, Can You Do it Too? More and more buckets NCETM: Activity A Learning review KM: 2M11 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)	<ul style="list-style-type: none"> 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. Some pupils may think that milli- refers to 'million' Some pupils may think that cm (for example) is the unit for measuring anything

Concrete	Pictorial	Abstract
<ul style="list-style-type: none"> 		<ul style="list-style-type: none">



PUMA assessment criteria			NCETM – Exemplification
Autumn	Spring	Summer	<ul style="list-style-type: none"> 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 long it takes me to wash my hands. Choose a piece of equipment to help you measure: the weight of your shoe; how long the classroom is; how long this lesson lasts; how much water a cup holds. How long is this line? Now draw a line 2 cm longer than this one. Find an object in the classroom that you think is about 10 cm long. About how heavy do you think your pencil case is? How much water is in this measuring jug? Megan and Jack 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 > or < ? 
<ul style="list-style-type: none"> choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm) to the nearest appropriate unit, using rulers compare and order lengths and record the results using >, < and = 	<ul style="list-style-type: none"> choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g) to the nearest appropriate unit, using rulers, scales compare and order lengths, masses and record the results using >, < and = 	<ul style="list-style-type: none"> 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, masses, volume/capacity and record the results using >, < and = 	



Key concepts (National Curriculum statements) **The Big Picture:** [Measurement and mensuration progression map](#)

- 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

Notes and guidance (non-statutory)

- They 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.

Continuum References

Band 1 (N-WT)	Band 3 (R-WT)	Band 5 (R-AT)	Band 7 (1-WT)	Band 8 (1-AT)
N/A	N/A	N/A	Identifies coins and order them according to their value.	Recognises and knows the value of different denominations of coins and notes in order to use to solve problems including giving change from £5
Band 2 (N-AT)	Band 4 (R-WT)	Band 6 (1-WT)		
N/A	N/A	N/A		

Possible themes	Possible key learning points
<ul style="list-style-type: none"> Explore money Solve problems involving money 	<ul style="list-style-type: none"> Recognise and use the symbols for pounds (£) and pence (p) Read and say amounts of money combining the coins 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2 Count, say and record amounts of money combining the coins 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2 Find different combinations of coins that equal the same amounts of money Solve practically simple problems involving addition of money Solve practically simple problems of money, including giving change

Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> Add and subtract one- and two-digit numbers to 20 Recognise the coins: 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2 Recognise the notes: £5 and £10 	Money Coin Change Note Notation Pounds (£) Pence (p)	This is the first time that pupils explore solving money problems in the classroom. This unit should be very practical. Pupils are expected to be able to record the solution using £ or p notation. Note: Decimal notation for money is not introduced formally until Stage 4. NCETM: Glossary Common approaches <i>All classrooms have a collection of real money</i> <i>£ and p are not yet used together to record an amount of money, for example £3.27 or 327p but not £3.27p</i>

Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> Kenny thinks that 'the larger the size of the coin, the greater the value of the coin'. Do you agree with Kenny? What is the same and what is different: 2p coin, 5p coin, 10p coin, 20p coin? Always/Sometimes/Never: Coins are circular. NCETM: Measurement Reasoning	KM: Stick on the Maths L2CALC3: Solving problems NRICH: Five Coins NRICH: Money Bags NCETM: Activity C Learning review NCETM: NC Assessment Materials (Teaching and Assessing Mastery)	<ul style="list-style-type: none"> 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. Some pupils may think that all coins are circular. 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

Concrete	Pictorial	Abstract



PUMA assessment criteria			NCETM – Exemplification
Autumn	Spring	Summer	
<p>recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value</p> <p>find different combinations of coins to equal the same amounts of money · e.g. find different ways to make 25p</p> <p>solve simple problems in a practical context involving addition and subtraction of money of the same unit including giving change e.g. I buy a toy for £14; how much change do I get from £20?</p>	<p>recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value</p> <p>find different combinations of coins to equal the same amounts of money</p> <p>solve simple problems in a practical context involving addition and subtraction of money of the same unit including giving change e.g. I buy 2 bags of sweets for 20p each, how much change will I get from 50p?</p>	<p>recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value e.g. make 73p using the fewest coins</p> <p>find different combinations of coins to equal the same amounts of money</p> <p>solve simple problems in a practical context involving addition and subtraction of money of the same unit including giving change e.g. I buy a cake for 60p and a biscuit for 25p, how much change will I get from £1?</p>	<p>solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change</p> <ul style="list-style-type: none"> ➤ Jess has saved 62p. She spends 15p. How much money does she have left? She pays with a 50p piece. How much change does she get? ➤ 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 ➤ Holly has these coins. ➤ Harry has the same amount of money but has six coins. What are they? Is there only one possible answer? <div style="text-align: right;">  </div>



Key concepts (National Curriculum statements) **The Big Picture:** [Statistics progression map](#)

- 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).

Continuum References

Band 1 (N-WT)	Band 3 (R-WT)	Band 5 (R-AT)	Band 7 (1-WT)	Band 8 (1-AT)
N/A	N/A	N/A	N/A	N/A
Band 2 (N-AT)	Band 4 (R-WT)	Band 6 (1-WT)		
N/A	N/A	N/A		

Possible themes	Possible key learning points
<ul style="list-style-type: none"> Collect information Sort information Use pictures to represent information 	<ul style="list-style-type: none"> Interpret a pictogram where the symbol represents a single item Interpret a pictogram where the symbol represents a multiple of 2 items Interpret a pictogram where the symbol represents a multiple of 5 items Construct a pictogram where the symbol represents a single item Construct a pictogram where the symbol represents a multiple of 2 items Construct a pictogram where the symbol represents a multiple of 5 items Interpret and construct a tally chart Interpret and construct a block diagram Interpret information in a simple table Create a table to show information Ask and answer simple questions by counting the number of objects in each category Ask and answer questions about totalling and comparing categorical data

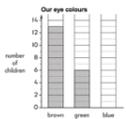
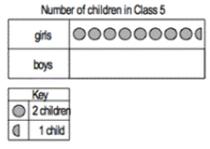
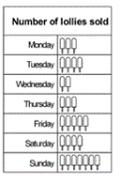
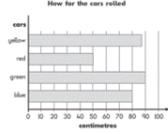
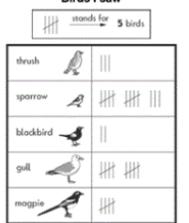
Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number Compare the value of numbers Order numbers 	Data Pictogram Tally, Tally chart Block diagram Table Category, Categorical data Total Compare Notation When tallying, groups of five are created by striking through each group of four	In stage 2, pictograms use a symbol for each individual unit and also many-to-one correspondence such as 2, 5 and 10 units. NCETM: Glossary Common approaches <i>Pupils need to remember that tallies are blocks of five – make links that the word ‘TALLY’ has five letters and tallying involves making blocks of five. Pupils always construct or identify the key for a pictogram before doing anything else.</i>

Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> Show me a tally. And another. And another. Kenny thinks that the correct tally for ‘8’ is . Do you agree with Kenny? Explain your answer. Always/Sometimes/Never: A symbol in a pictogram represents one unit. NCETM: Statistics Reasoning	KM: Make a ‘Human’ Block Diagram by asking pupils to stand on a giant set of axes. KM: Stick on the Maths HD4: Recording results KM: Stick on the Maths HD2: Representing work KM: Stick on the Maths HD5: Communicating findings NRICH: Sticky Data NRICH: If the World Were a Village NRICH: Ladybird Count NCETM: Activity E Learning review NCETM: NC Assessment Materials (Teaching and Assessing Mastery)	<ul style="list-style-type: none"> Some pupils may cross off each five when tallying, rather than crossing of each four lines with a fifth. Some pupils may not group in fives when tallying Some pupils may think that a symbol always represents one unit in a pictogram.

Concrete	Pictorial	Abstract
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PUMA assessment criteria		NCETM – Exemplification																			
Autumn	Spring	Summer																			
<p>interpret and begin to construct simple pictograms, tally charts, block diagrams and simple tables</p> <p>answer simple questions by counting the number of objects in each category and sorting the categories by quantity</p> <p>answer questions about totalling and comparing categorical data.</p>	<p>interpret and construct simple pictograms e.g. where the symbol represents 2, 5 or 10 units, tally charts, block diagrams and simple tables</p> <p>answer simple questions by counting the number of objects in each category and sorting the categories by quantity</p> <p>answer questions about totalling and comparing categorical data.</p>	<p>interpret and construct simple pictograms e.g. where the symbol represents 2, 5 or 10 units, tally charts, block diagrams and simple tables</p> <p>answer simple questions by counting the number of objects in each category and sorting the categories by quantity</p> <p>answer questions about totalling and comparing categorical data.</p>	<p>interpret and construct simple pictograms, tally charts, block diagrams and simple tables</p> <p>Class 2 make a graph</p>  <p>5 children have blue eyes. Show this on a graph. More children have brown eyes than green eyes. How many more?</p> <p>ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity</p> <ul style="list-style-type: none"> Look at this pictogram There are 12 boys in class 5. Show this on a pictogram.  <ul style="list-style-type: none"> A shop sold 10 ice lollies on Wednesday. How many lollies were sold on Monday? How many more lollies were sold on Tuesday than on Wednesday?  <p>ask and answer questions about totalling and comparing categorical data</p> <ul style="list-style-type: none"> Some children rolled toy cars down a slope  <p>How far did the blue car roll? How much further did the green car roll than the red car? additional questions: Which car rolled the furthest? Make up a question about the red car and the yellow car.</p> <p>Jane made a tally chart How many more gulls than blackbirds did she see? Additional questions: Make up a question comparing the numbers of sparrows and blackbirds that Jane saw? How many fewer thrushes than magpies did she see?</p>  <ul style="list-style-type: none"> Some children were asked to choose their favourite animal in the zoo. This table shows the results. <p>How many more girls than boys chose the giraffes? How many more boys chose lions than elephants? Which animal was chosen by the greatest number of children</p> <table border="1" data-bbox="1858 905 2026 1053"> <thead> <tr> <th></th> <th>Girls</th> <th>Boys</th> </tr> </thead> <tbody> <tr> <td>zebra</td> <td>9</td> <td>3</td> </tr> <tr> <td>lion</td> <td>4</td> <td>9</td> </tr> <tr> <td>giraffe</td> <td>7</td> <td>4</td> </tr> <tr> <td>monkey</td> <td>8</td> <td>7</td> </tr> <tr> <td>elephant</td> <td>6</td> <td>5</td> </tr> </tbody> </table>		Girls	Boys	zebra	9	3	lion	4	9	giraffe	7	4	monkey	8	7	elephant	6	5
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