

Primary Mathematics Scheme of Work: Stage 1

Unit	Lessons	Key 'Build a Mathematician' (BAM) Indicators	Essential knowledge
Numbers and the number system	12	<ul style="list-style-type: none"> Read and write numbers from 1 to 20 in numerals and in words Count to and across 100, forwards and backwards from any given number Count from zero in multiples of 2, 5 and 10 Add and subtract a two-digit number and a one-digit number up to 20 Solve one-step multiplication and division problems by using concrete objects and pictorial representations Write addition and subtraction statements using the symbols '+', '-' and '=' Recognise and name the fractions $\frac{1}{2}$ and $\frac{1}{4}$ Tell the time to the hour, and half past the hour, using an analogue clock Sequence events in chronological order Use the comparative vocabulary of length, mass, capacity and time Recognise and name rectangles (including squares), circles and triangles Recognise and name cuboids (including cubes), pyramids and spheres Describe position and movement 	<ul style="list-style-type: none"> Know the symbols $=, +, -, \times, \div$ Know doubles and halves up to 10 Know number bonds to 10 Know the value of different denominations of coins and notes Know the days of the week Know the meaning of 'weeks', 'months' and 'years'
Visualising and constructing	12		
Calculating: addition and subtraction I	12		
Exploring time	12		
Calculating: addition and subtraction II	12		
Measuring space	12		
Exploring fractions	8		
Mathematical movement	8		
Exploring money	8		
Calculating: multiplication and division	12		
Numbers and the number system: Going deeper	4		
Calculating: addition and subtraction I: Going deeper	4		
Calculating: addition and subtraction II: Going deeper	8		
Preventing the gap / Going deeper	16		
Total:	140	Stage 1 BAM Progress Tracker Sheet	

Maths Calendar

Based on 4 maths lessons per week, with at least 35 'quality teaching' weeks per year

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Numbers and the number system 1M1 BAM, 1M3 BAM			Visualising and constructing 1M11 BAM, 1M12 BAM			Calculating: addition and subtraction I 1M2 BAM			Exploring time 1M8 BAM, 1M9 BAM			Assess / enrich
Week 14	Week 15	Week 16	Week 17	Week 18	Week 19	Week 20	Week 21	Week 22	Week 23	Week 24	Week 25	Week 26
Assess / enrich	Calculating: addition and subtraction II 1M4 BAM, 1M6 BAM			Measuring space 1M10 BAM			Exploring fractions 1M7 BAM		Mathematical movement 1M13 BAM		Preventing the gap / Going deeper	
Week 27	Week 28	Week 29	Week 30	Week 31	Week 32	Week 33	Week 34	Week 35	Week 36	Week 37	Week 38	Week 39
Assess / enrich	Exploring money		Calculating: multiplication and division 1M5 BAM			NNS: deeper	CAS1: deeper	CASII: deeper		Assess / enrich	Preventing the gap / Going deeper	



Key concepts (National Curriculum Statements)

- 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, and use the language of: equal to, more than, less than (fewer), most, least
- count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens

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

Possible themes	Possible key learning points	
<ul style="list-style-type: none"> • Explore the value of numbers • Explore where numbers live in our number system • Solve problems comparing the value of numbers • Investigate number patterns 	<ul style="list-style-type: none"> • Show the value of a number using objects or pictures • Read numbers to 20 in numerals and words • Write numbers to 20 and beyond in numerals • Write numbers to 20 in words • Identify and represent numbers on the number line • Identify and represent numbers using pictorial representations 	<ul style="list-style-type: none"> • Compare the value of numbers explaining if they are more/ less than or equal to another number or numbers • Read and write numbers to 100 in numerals • Count on to or back from numbers in ones from any given number up to 100 • Count in multiples of two starting from zero • Count in multiples of five starting from zero • Count in multiples of ten starting from zero
Prerequisites	Mathematical language	Pedagogical notes
	<p>One, Two, Three, Four, Five, Six, Seven, Eight, Nine, Ten, Eleven, Twelve, Thirteen, Fourteen, Fifteen, Sixteen, Seventeen, Eighteen, Nineteen, Twenty</p> <p>More than, greater, larger, bigger</p> <p>Less than, fewer, smaller</p> <p>Equal to, the same amount as, as many as</p> <p>Greatest/ Most/biggest/largest</p> <p>Least/fewest/smallest</p> <p>Hundreds, Tens, units (ones)</p> <p>Exchange</p> <p>Digit</p> <p>Notation</p> <p>The equals symbol (=)</p>	<p>Pupils need to understand that there is a 'stable order' to our counting system and that we say the numbers in a set order (i.e. 1,2,3,4,5,6 not 1,4,3,5,2 etc..). They also need to understand that numbers can be used as labels to represent the final (cardinal) value of a set of objects (i.e. 12 cakes).</p> <p>Pupils need to understand that when counting in our number system we count objects into groups of ten and then groups of one hundred.</p> <p>The = symbol should be modelled when exploring numbers that are equal in value. Practical apparatus such as a pan balance can be used to support this comparison. (Where an equal set of the same weight objects can be compared and the = symbol displayed in the centre of the balance).</p> <p>NRICH: How can I support the development of Early Number Sense and Place Value?</p> <p>NCETM: Glossary</p> <p>Common approaches</p> <p><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.</i></p> <p><i>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></p>
Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> • Show me (find/ write) the number that will label this group of objects. And Another. And Another. • Show me (find/write) a number with 2 tens and another... and another. Which of your numbers is the greatest? And Another. • Can you change this pot so that it has enough pencils for 8 children? • Convince me that 13 is less than 20. • Always/Sometimes/Never: A number with 9 in the units is always bigger than one with 6 in the units. 	<p>KM: Grab a group</p> <p>KM: Greater (more) than/ less than</p> <p>KM: Practical counting activities where pupils are encouraged to support with everyday problems (i.e. counting out and labelling the correct number of milk cartons, pencils, aprons, balls for P.E. etc.)</p> <p>NRICH: Count the crayons, Matching numbers, 6 beads</p> <p>Learning review</p> <p>KM: 1M1 BAM Task, 1M3 BAM Task</p> <p>NCETM: NC Assessment Materials (Teaching and Assessing Mastery)</p>	<ul style="list-style-type: none"> • Some pupils may appear to be counting confidently but they may just be mimicking the rhythm of the counting pattern. • Some pupils may not be confident in counting over the tens boundaries • Some pupils may not understand that a number can be used to show/ label the final (cardinal) value of the set of objects being counted, i.e. the final number that they have said represents the value of the objects in the set. • Some pupils may muddle the 'teen' and the 'ty' numbers • Some pupils may read the units digit before the tens digit.



Key concepts (National Curriculum statements)

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

- recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]; 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

[Return to overview](#)

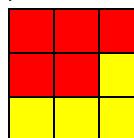
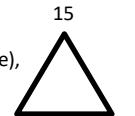
Possible themes	Possible key learning points	
<ul style="list-style-type: none"> • Explore 2 –D shapes • Compare 2 –D shapes • Explore 3 –D shapes • Compare 3-D shapes 	<ul style="list-style-type: none"> • Recognise 2-D shapes • Recognise and name rectangles • Recognise and name squares • Recognise and name circles • Recognise and name triangles • Compare 2-D shapes and explain how they are similar or different 	<ul style="list-style-type: none"> • Recognise 3-D shapes • Recognise and name cuboids • Recognise and name cubes • Recognise and name pyramids • Recognise and name sphere • Compare 3-D shapes and explain how they are similar or different
Prerequisites	Mathematical language	Pedagogical notes
	<p>2-D shape (polygon) Rectangle, square, circle, triangle and other 2-D shapes if appropriate 3-D shape Cuboid, cube, cone, cylinder, pyramid, sphere Shape, pattern Flat, curved, straight, round, hollow, solid Corner, point, pointed Face, side, edge, end Sort, make, build, draw</p>	<p>Note that a square is a rectangle but a rectangle is not necessarily a square. A rectangle is a 4 sided polygon with opposite sides that are equal in length and 4 right angled corners. 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.</p> <p>NCETM: Glossary</p> <p>Common approaches <i>Every classroom displays shapes in different orientations.</i> <i>Every classroom displays regular and irregular hexagons, pentagons, octagons and decagons</i></p>
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 (rectangle, circle, triangle, cuboid, cube, cone, pyramid, sphere etc.) • Always/ Sometimes/Never: A shape with 4 straight sides is a square. • Always/ Sometimes/Never: A shape with 3 sides and 3 corners is a triangle 	<p>KM: Making shapes: Encourage pupils to explore the properties of 2-D and 3-D shapes using practical apparatus such as geoboards, construction apparatus, ICT resources for example the polygon ITP and outdoor equipment (for example garden canes). Encourage the pupils to match cards with names of the shapes written on them (or to attempt to spell the names themselves)</p> <p>KM: Shape challenges: Link challenges involving shapes to other areas of the curriculum. (For example what shapes could they use to create a repeating pattern for some wrapping paper etc.)</p> <p>NRICH: Chain of changes Playing with 2D shape Matching Triangles What Shape for Two</p> <p>Learning review KM: 1M11 BAM Task, 1M12 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)</p>	<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 be confused over 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



Key concepts (National Curriculum statements)

- given a number, identify one more and one less
- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- represent and use number bonds and related subtraction facts within 20

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

Possible themes	Possible key learning points	
<ul style="list-style-type: none"> Investigate one more or one less than any number Investigate number patterns Explore addition and subtraction facts 	<ul style="list-style-type: none"> Identify the number that is one more than a given number Identify the number that is one less than a given number Know addition facts to 10 Know subtraction facts from 10 Know addition facts within 10 Know subtraction facts within 10 	<ul style="list-style-type: none"> Know addition facts to 20 Know subtraction facts from 20 Know addition facts within 20 Know subtraction facts within 20 Count to and across 100 and beyond in ones from any number Count back from 100 and beyond in ones from any number
Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> Order numbers to 20 accurately Understand how a number line is organised Count accurately from 0 to 21 Count up to 20 objects accurately and attribute the correct numeral to label the set Subitise small groups of objects (i.e. can say how many there are without needing to count each individual object.) Understand the 'cardinal' value of a set/ array. (Once it has been counted they understand that they don't need to count again.) 	One more, one less Count on, count back One hundred Number bonds/ number facts Addition facts/ subtraction facts Fact family	<p>It is vital that pupils are supported in identifying numbers more/ less than a given number and in counting to from 100 and beyond with visual resources such as the number line or number grid.</p> <p>It is helpful to show the pupils that the number grid is actually just a number track in a different <i>orientation</i> (<i>as some pupils will not have made the connection</i>)</p> <p>KM: Progression: Addition and Subtraction and Calculation overview NCETM: The Bar Model and Subtraction NCETM: Glossary</p> <p>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.</i> <i>When exploring addition and subtraction facts pupils are given the opportunity to explore relationships practically and to understand how subtraction undoes addition. Encourage them to explore the relationships and to notice patterns through linking the practical exploration with the abstract notation as it will support them in internalising related facts.</i></p>
Reasoning opportunities and probing questions		Suggested activities
<ul style="list-style-type: none"> I'm thinking of a number. It is 1 more / less than 36. What number am I thinking of? Kenny says that one less than 53 is 43. Is he correct? I will clap where a number is missing: 78, 79, 80 ... clap ... 82, 83, 84. What number did I miss? If I know that $3 + 7 = 10$, what else do I know? What facts can you tell me from this array? 	<p>KM: One more/one less; Pause it ; Stand up if you are...</p> <p>KM: Fact families: Use practical apparatus (arrays) to explore related number facts. For example fact family puzzles (which pieces combine to reach the target number), coat hanger and pegs, flip flaps, bags with different target amounts (and different combinations of coloured counters; i.e. 2 red and 4 blue), the ITP number facts and triominoes (see example)</p> <p>Learning review KM: 1M2 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)</p>	 <p>Some pupils might count the number that they are starting from as one of the numbers in the count when adding on or counting back. Some pupils may appear to be counting confidently but they may just be mimicking the rhythm of the counting pattern. When exploring related number facts some pupils may just manipulate the numbers and record incorrectly. For example instead of understanding that they need to subtract from the largest number (for example $10 - 6 = 4$) they may move the numbers around because they think they are related (for example $6 - 4 = 10$).</p>



Key concepts (National Curriculum statements)

- recognise and use language relating to dates, including days of the week, weeks, months and years
- sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
- tell the time to the hour and half past the hour and draw the hands on a clock face to show these times

The Big Picture: [Measurement and mensuration progression map](#)[Return to overview](#)

Possible themes	Possible key learning points	
<ul style="list-style-type: none"> • Understand the vocabulary of time • Organise events • Explore telling the time 	<ul style="list-style-type: none"> • Know and use the days of the week • Know and use the months of the year • Know the number of days in each month • Recognise and use language relating to dates, including days of the week, weeks, months and years • Tell the time to the hour • Tell the time to half past the hour • Draw hands on a clock face to show time to the hour and half past the hour • Draw hands on a clock face to show time to half past the hour • Sequence events in chronological order within the same day • Sequence events in chronological order within the same week • Solve simple problems involving time 	
Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> • Order numbers to 12 • Understand how a number line is organised 	<p>Day, week, month, season, year, leap year Weekend, fortnight Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday January, February, March, April, May, June, July, August, September, October, November, December Before, after, next, first, today, yesterday, tomorrow, morning, afternoon, evening Clock Hand, hour hand, minute hand Hour, minute o'clock, half past</p> <p>Notation A colon is used to separate hours and minutes when writing the time</p>	<p>Many people see Monday as the first day of the week as this links to the working week and makes sense as we describe a Saturday and Sunday as the weekend with the children. Notice the content of rhymes and songs as most start with Sunday as the first day of the week.</p> <p>While this unit focuses on pupils' understanding of key concepts and facts related to time, it is important that the ideas are reinforced through the whole year.</p> <p>Notice that months 1, 3, 5, 7 and 8, 10, 12 have 31 days.</p> <p>October was originally the eighth month in the Roman calendar (and so on), but the months of January and February were later inserted. July and August were also renamed in honour of Roman emperors.</p> <p>NCETM: Glossary</p> <p>Common approaches <i>Sunday is promoted as the first day of the week (Sunday is linked to history as the first day of the week, as in religion people rested on the Sabbath (Saturday) and celebrated on the Sunday.)</i></p> <p><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></p>
Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> • Show me a month in the summer. And another, and another. • What is the same and what is different: Monday, Wednesday, Thursday, Saturday? • Convince me that there are seven days in a week • Always / Sometimes / Never: <ul style="list-style-type: none"> - You get dressed before you go to school - You have lunch at 12 o'clock 	<p>KM: Your week in a box KM: Build and explore a clock</p> <p>KM: Create a visual timetable for each school day and encourage the children to create visual timetables for their weekend. Use these as reference points to model/use/reinforce days of the week.</p> <p>NRICH: Times of Day NRICH: Snap NCETM: Activity C NCETM: Activity D</p> <p>Learning review KM: 1M8 BAM Task, 1M9 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)</p>	<ul style="list-style-type: none"> • Some pupils may think that the hour hand is the long hand as it is more important • Some pupils may think that every month is of equal length • Some pupils may read a clock face in an anti-clockwise direction • Some pupils may think that there are ten months in a year



Key concepts (National Curriculum statements)

- read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$

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

Possible themes	Possible key learning points	
<ul style="list-style-type: none"> • Explore ways of writing mathematical statements • Solve addition and subtraction problems 	<ul style="list-style-type: none"> • Add two one-digit numbers to 20, including zero • Add a one-digit and two-digit numbers to 20, including zero • Read and interpret statements involving the symbols '+' and '=' involving numbers up to 20 • Write statements involving the symbols '+' and '=' involving numbers up to 20 • Subtract one-digit number (a) from another one-digit number (b, a<b) within 20, including zero • Subtract a one-digit number from a two-digit numbers within 20, including zero 	<ul style="list-style-type: none"> • Read and interpret statements involving the symbols '-' and '=' involving numbers up to 20 • Write statements involving the symbols '-' and '=' involving numbers up to 20 • Solve one-step problems calculations involving numbers up to 20 using concrete objects and pictorial representations • Solve missing number problems involving adding numbers to 20 • Solve missing number problems involving subtracting numbers within 20
Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> • Identify the number that is one more than a number • Identify the number that is one less than a number • Know addition and subtraction facts to and from 10 • Know addition and subtraction facts within 10 • Know addition and subtraction facts to and from 20 • Know addition and subtraction facts within 20 • Pupils need to be able to count on and back in ones from any given number to 20. • Pupils need to be able to read, write and order numbers to at least 20 	<p>Add, subtract Count on, count back More, less Plus, minus, total, sum Difference between Equal, equal to</p> <p>Notation The symbols '+', '−' and '='</p>	<p>The equals symbol means 'the left side is equal in value to the right side'. It is sometimes seen as meaning 'the answer is' and as a result pupils may think that $7 = 3 + 4$ is not a correct statement, or they may think that $2 + 5 = 3 + 4$ is an incomplete statement.</p> <p>The equals symbol (=) was introduced in 1557 by a Welsh mathematician named Robert Recorde. He also introduced the addition symbol (+) to the English-speaking world.</p> <p>To help develop conceptual understanding concrete apparatus (base-10 equipment, Numicon, etc.) needs to be used alongside pictorial representations (an empty number line, partitioning, etc.)</p> <p>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</p> <p>Common approaches <i>To avoid confusion with language, all teachers use 'sum' to refer only to the result of an addition. Teachers say 'complete these calculations' instead of 'complete these sums'</i> <i>Teachers avoid saying '2 take away 7' is not possible.</i></p>
Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> • Always / Sometimes / Never: The equals sign always comes at the end of the mathematical statement • Convince me that $5 = 9 - 4$ • Convince me that $12 + 7 = 19$ • Show me a calculation which is equal to 7. And another, and another... 	<p>KM: Balance statements KM: Using a large number track or number tiles encourage the children to step along the number line to count on / back to aid addition / subtraction. Discuss whether pupils could step in different step sizes and use their knowledge of number bonds to 10 to help them.</p> <p>NRICH: I'm Eight NRICH: 2, 4, 6, 8 NCETM: Activity A, Activity C</p> <p>Learning review KM: 1M4 BAM Task, 1M6 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)</p>	<ul style="list-style-type: none"> • Some pupils may first include the number that they count from, add to or subtract from (therefore they may be out by 1 each time) • Some pupils may think that the equals sign means 'makes', or "is equal to" • Some pupils may think that there always 'has to be an answer' when writing statements using the equals symbol



Key concepts (National Curriculum statements)

- measure and begin to record the following: lengths and heights; mass/weight; capacity and volume; time (hours, minutes, seconds)
- compare, describe and solve practical problems for: lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]; mass/weight [for example, heavy/light, heavier than, lighter than]; capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]; time [for example, quicker, slower, earlier, later]

The Big Picture: [Measurement and mensuration progression map](#)[Return to overview](#)

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 time 	<ul style="list-style-type: none"> Measure length using appropriate equipment Measure mass using appropriate equipment Measure capacity using appropriate equipment Measure time using hours, minutes and seconds using appropriate equipment Record measurements using a system of non-standard or standard units Compare and order lengths using long/short, longer/shorter, tall/short, double/half Compare and order masses using heavy/light, heavier than, lighter than 	<ul style="list-style-type: none"> Compare and order capacities using full/empty, more than, less than, half, half full, quarter Compare and order times using quicker, slower, earlier, later Select appropriate language when making comparisons Solve practical problems involving length, height, mass, volume Solve practical problems involving time
Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> Understand the concept of time 	<p>Measure Length, height, distance Mass, weight Time Capacity, volume Long, short, longer, shorter, tall, taller Heavy, light, heavier, lighter Full, empty, half full Quicker, slower, earlier, later More than, greater than, less than Double, half, quarter Hour, minutes, second Ruler Container Order, Compare</p>	<p>When introducing any work on measurement (especially considering non-standard versus standard units) it is important that pupils understand the importance of measuring accurately. Accuracy will need modeling at every opportunity and any misuse of measuring apparatus needs to be picked up quickly.</p> <p>Many pupils may not be at the stage to work with numbers beyond 20 confidently (therefore reading a ruler or metre stick may prove too difficult) However they could be encouraged to compare objects in relation to a benchmark object such as the length of a ruler saying whether they are longer/ shorter.</p> <p>During this unit pupils should be encouraged to develop their own non-standard units for measuring. They then need opportunities to explore why a standard unit of measure is more useful as this allows them to make consistent comparison with other measurements (even if they have not been made that measurement)</p> <p>NCETM: Glossary</p> <p>Common approaches</p> <p><i>Every classroom has a range of measuring equipment and scales immediately available</i></p> <p><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></p>
Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> Convince me that you can use metre sticks to measure the mass of a bag of apples Show me a minute (in silence!) Show me an item longer than this ruler. And another, and another ... Show me an item heavier than this book. And another, and another 	<p>KM: Mind the gap NRICH: Little Man NRICH: Sizing Them Up NCETM: Activity A</p> <p>Learning review KM: 1M10 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)</p>	<ul style="list-style-type: none"> Some pupils may think that cm (for example) is a unit for measuring anything Some pupils may think that all times have to be measured in minutes Some pupils may think that the straight line is longer than the wiggly line 

Key concepts (National Curriculum statements)

- recognise, find and name a half as one of two equal parts of an object, shape or quantity
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

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

Possible themes	Possible key learning points	
• Explore fractions	<ul style="list-style-type: none"> • Recognise a half as one of two equal parts of an object or shape • Recognise a half as one of two equal parts of a quantity • Recognise a quarter as one of four equal parts of an object or shape • Recognise a quarter as one of four equal parts of a quantity 	
Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> • Know the language of double and half • Know the meaning of the word 'equal' 	Part Equal Whole Half, halves Quarter Fraction Numerator Denominator Notation Horizontal bar for fractions; $\frac{1}{2}, \frac{1}{4}$ Diagonal bar for fractions; $\frac{1}{2}, \frac{1}{4}$	<p>It would help if the children had experience of splitting objects/ shapes/ quantities equally (and comparing whether they are exactly equal) before introducing them to the concept of fractions.</p> <p>Pupils need opportunities to explore how to find fractions of objects and shapes and then represent what they have found. For example, once they have identified that they have split a shape into two equal parts and have taken out one of the parts, then the fractional notation can be introduced and will make more sense.</p> <p>It is also beneficial to discuss possible early misconceptions such as 'Please may I have the bigger half' when discussing a slice of cake/ pizza etc. as this is a great opportunity to discuss the need for fractions to be equal amounts.</p> <p>NCETM: Teaching fractions NCETM: Glossary</p> <p>Common approaches <i>Pupils are expected to use horizontal bar notation for fractions</i></p>
Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> • (Given a 2 by 2 grid) Show me $\frac{1}{2}$ of this shape. And another, and another ... • (Given a 4 by 3 grid) Show me $\frac{1}{4}$ of this shape. And another, and another ... • Convince me that you can split a group of 9 objects in half • Kenny says that he would like the bigger half. Is this possible? Explain your answer. 	KM: To quarter or not to quarter (part 1) NRICH: Halving NRICH: Happy Halving NRICH: Making longer, making shorter Learning review KM: 1M7 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)	<ul style="list-style-type: none"> • Some pupils may not understand that when splitting one whole into a fractional amount, each part must be equal • Some pupils may think that a quarter is a larger piece than a half since 4 is greater 2 • Some pupils may not appreciate that when shading a fraction of a shape, the position of the shaded section can vary



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

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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 a turn, including whole and half turns Use mathematical language to describe a turn, including quarter turns Use mathematical language to describe a turn, including three-quarter turns 	<ul style="list-style-type: none"> Describe position, direction and movement, including whole turns Describe position, direction and movement, including half turns Describe position, direction and movement, including quarter and three-quarter turns
Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> Describe position using language such as 'behind' or 'next to' Know the language of half and quarter 	Position Direction Top, middle, bottom On top of In front of Above Between Around, Near, Close, Far Up, Down Inside, Outside Forwards, Backwards Left, Right Half turn, Quarter turn, Three-quarters turn Straight Line Clockwise	<p>Pupils follow clues, such as 'on top of', 'between', 'inside', etc., to find missing objects. Pupils experience following instructions, devising and stating instructions for other pupils/robots to follow.</p> <p>Note:</p> <ul style="list-style-type: none"> - Turning 'anticlockwise' is introduced in Stage 2 - Recognising three quarters as three of four equal parts of an object, shape or quantity is explored in detail in Stage 2 - Understanding degrees as a way of measuring angles is not introduced until Stage 5 - NCETM: Glossary <p>Common approaches</p> <p><i>All pupils practically experience the 'feel' of a whole, half, quarter and three-quarters turn</i></p> <p><i>Pupils are shown how to remember left and right by identifying the 'L' shape formed by extending the thumb and forefinger on their left hand.</i></p>
Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> Show me a quarter turn. An another, and another ... Convince me this is a quarter turn:  <ul style="list-style-type: none"> Jenny walks fours steps forward, turns a quarter turn clockwise and walks 2 steps forward. Lenny says 'if Jenny now walks 2 steps backwards, turns a quarter turn clockwise and walks four steps backwards, she will return to the start.' Do you agree with Kenny? Explain your answer. Kenny says, 'A turn of four quarters turns is the same as doing nothing at all'. Do you agree with Kenny? Explain why. <p>NCETM: Geometry: Position Direction and Movement Reasoning</p>	KM: Stick on the Maths SSM2: Everyday language: Positions of Shapes KM: Stick on the Maths SSM3: Positions of Objects NRICH: Tangram Tangle NRICH: Olympic Rings NRICH: 2 Rings NRICH: Turning NCETM: Activity A, B, C, D and E Learning review KM: 1M13 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)	<ul style="list-style-type: none"> Some pupils may think that quarter turns have to look like this:  <ul style="list-style-type: none"> Some pupils may have difficulty remembering left and right Some pupils may get confused with 'clockwise'



Key concepts (National Curriculum statements)

- recognise and know the value of different denominations of coins and notes

The Big Picture: [Measurement and mensuration progression map](#)[Return to overview](#)

Possible themes	Possible key learning points		
• Explore money	<ul style="list-style-type: none"> • Recognise the coins: 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2 • Read and say amounts of money using the coins 1p, 2p, 5p, 10p, 20p, 50p • Recognise the coins: £1 and £2 • Read and say amounts of money using the coins £1 and £2 	<ul style="list-style-type: none"> • Count, say and record amounts of money using the coins 1p, 2p, 5p, 10p, 20p, 50p, £1 and £2 • Recognise the notes: £5 and £10 • Read and say amounts of money using the notes £5 and £10 • Solve simple problems involving money 	
Prerequisites	Mathematical language	Pedagogical notes	
• Beginning to use everyday language related to money.	Money Coin Note	<p>This is the first time that pupils explore money in the classroom. This unit should be very practical and focused on recognising and knowing the value of coins and notes.</p> <p>Note:</p> <ul style="list-style-type: none"> - Pupils are expected to be able to recognise and record money using £ or p notation in Stage 2 - Decimal notation for money is not introduced formally until Stage 4. <p>NCETM: Glossary</p> <p>Common approaches <i>All classrooms have a collection of real money</i></p>	
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. 	<p>NRICH: Money Bags NCETM: Activity B</p> <p>Learning review NCETM: NC Assessment Materials (Teaching and Assessing Mastery)</p>	<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 think that there are £1 and £2 are notes not coins. 	



Key concepts (National Curriculum statements)

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

- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher

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Possible themes	Possible key learning points	
<ul style="list-style-type: none"> Develop arithmetic skills Explore properties of numbers Explore ways of writing calculations Solve problems involving multiplication and division 	<ul style="list-style-type: none"> Double numbers up to at least 10 Halve numbers up to (at least) 20 Count (from zero) in equal steps of 2s Count (from zero) in equal steps of 5s Count (from zero) in equal steps of 10s Use concrete objects to solve one-step problems involving multiplication 	<ul style="list-style-type: none"> Use concrete objects to solve one-step problems involving division (grouping) Use concrete objects to solve one-step problems involving division (sharing equally) Use pictorial representations to solve one-step problems involving multiplication Use pictorial objects to solve one-step problems involving division (grouping) Use pictorial objects to solve one-step problems involving division (sharing equally) Use arrays to solve one-step problems involving multiplication
Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> Pupils need to be able to read, write and order numbers to at least 20 Subitise small groups of objects (i.e. can say how many there are without needing to count each individual object.) 	Calculation, Calculate Odd, Even Multiply, Multiplication, Times, Product Repeated addition Array Divide, Division Groups Grouping Sharing	<p>This is the first pupils explore multiplication and division. Through grouping and sharing, pupils make connections between arrays, number patterns, and counting in twos, fives and tens. Pupils need to work with small quantities and experience: doubling and halving numbers and quantities; and finding simple fractions of objects, numbers and quantities. Note:</p> <ul style="list-style-type: none"> Calculating mathematical statements for multiplication and division within the multiplication tables and writing them using the multiplication (\times), division (\div) and equals (=) signs is in Stage 2 Showing that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot is explored in Stage 2 <p>KM: Progression: Multiplication and Division and Calculation overview NCETM: The Bar Model NCETM: Multiplication, Division, Multiplicative reasoning NCETM: Glossary</p> <p>Common approaches <i>A variety of concrete apparatus – Numicon, Cuisenaire, 10 Frame, Counters -, are used to help pupils visualise odd /even numbers, doubling/halving and solve multiplication and division problems.</i> <i>Teachers say 'share equally' and not just 'share' when solving problems involving division.</i></p>
Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> Show me a number that you can half. And another. And another. Convince me double 6 is 12. Convince me 3 multiplied by 4 is 12 (using concrete apparatus such as Numicon, Cuisenaire, etc.). Convince me if 12 sweets are shared equally between 3 friend, each friend will receive 4 sweets (using concrete apparatus such as Numicon, Cuisenaire, etc.). Benny thinks you can double any number but only halve even numbers. Do you agree with Benny? Explain your answer. 	<p>KM: Stick on the Maths ALG1: Odd and Even NRICH: Lots of Biscuits! NRICH: Share Bears NCETM: Activity A, B and C</p> <p>Learning review KM: 1M5 BAM Task NCETM: NC Assessment Materials (Teaching and Assessing Mastery)</p>	<ul style="list-style-type: none"> Some pupils may interpret '3 multiplied by 4' as '4 groups/lots of 3' rather than '3 groups/lots of 4' Some pupils may try to give whole number answers for the half of an odd number – e.g. Half of 9 is 4 (or 5) Some pupils may not share equally when solving division problems – e.g. Divide 10 by 2: Answer 6 and 4



Key concepts (National Curriculum statements)

- 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, and use the language of: equal to, more than, less than (fewer), most, least
- count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens

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

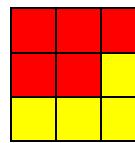
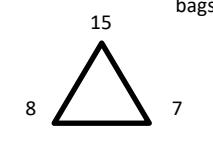
Possible themes	Possible key learning points	
<ul style="list-style-type: none"> • Explore the value of numbers • Explore where numbers live in our number system • Solve problems comparing the value of numbers • Investigate number patterns 	<ul style="list-style-type: none"> • Solve problems involving: <ul style="list-style-type: none"> - reading and writing numbers from 1 to 20 in numerals and words. - identifying and representing numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least - counting, reading and writing numbers to 100 in numerals; count in multiples of twos, fives and tens 	
Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> • Show the value of a number using objects or pictures • Read numbers to 20 and beyond in numerals and words • Write numbers to 20 and beyond in numerals and words • Show where a number lives on the number line • Compare the value of numbers explaining if they are more/ less than or equal to another number or numbers • Count on to or back from 100 and beyond in ones from any given number • Count on to or back from 100 and beyond in multiples of two starting from zero • Count on to or back from 100 and beyond in multiples of five starting from zero • Count on to or back from 100 and beyond in multiples of ten starting from zero 	<p>One, Two, Three, Four, Five, Six, Seven, Eight, Nine, Ten, Eleven, Twelve, Thirteen, Fourteen, Fifteen, Sixteen, Seventeen, Eighteen, Nineteen, Twenty More than, greater, larger, bigger Less than, fewer, smaller Equal to, the same amount as, as many as Greatest/ Most/biggest/largest Least/fewest/smallest Hundreds, Tens, units (ones) Exchange Digit</p> <p>Notation The equals symbol (=)</p>	<p>Note: Curriculum time has been prioritised to ensure all pupils secure a deep understanding of the age related expectations for the Number strands of the Year 1 Programme of Study. The key concepts for this unit are the same as the other Stage 1 'Numbers and the number system' unit but this unit should be taught with an increased emphasis on developing pupils' reasoning skills, solving more complex problems and using explicit misconceptions and mistakes to deepen and challenge pupils' understanding.</p> <p>Further guidance on teaching for mastery can be found in the 'Introduction' of the NCETM: NC Assessment Materials (Teaching and Assessing Mastery) resources.</p>
Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> • Show me (find/ write) the number that will label this group of objects. And Another. And Another. • Show me (find/write) a number with 2 tens and another... and another. Which of your numbers is the greatest? And Another. • Can you change this pot so that it has enough pencils for 8 children? • Convince me that 13 is less than 20. • Always/Sometimes/Never: A number with 9 in the units is always bigger than one with 6 in the units. 	<p>KM: Grab a group KM: Greater (more) than/ less than KM: Practical counting activities where pupils are encouraged to support with everyday problems (i.e. counting out and labelling the correct number of milk cartons, pencils, aprons, balls for P.E. etc.)</p> <p>NRICH: Count the crayons NRICH: Matching numbers NRICH: 6 beads</p> <p>Learning review NCETM: NC Assessment Materials (Teaching and Assessing Mastery)</p>	<ul style="list-style-type: none"> • Some pupils may appear to be counting confidently but they may just be mimicking the rhythm of the counting pattern. • Some pupils may not be confident in counting over the tens boundaries • Some pupils may not understand that a number can be used to show/ label the final (cardinal) value of the set of objects being counted. If a pupil is asked to count a group of objects and then asked how many there are in the set, if they have to count again, then they do not have an understanding that the final number that they have said represents the value of the objects in the set. • Some pupils may muddle the 'teen' and the 'ty' numbers • Some pupils may read the units digit before the tens digit.



Key concepts (National Curriculum statements)

- given a number, identify one more and one less
- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- represent and use number bonds and related subtraction facts within 20

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

Possible themes	Possible key learning points	
<ul style="list-style-type: none"> Investigate one more or one less than any number Investigate number patterns Explore addition and subtraction facts 	<ul style="list-style-type: none"> Solve problems involving: <ul style="list-style-type: none"> given a number, identify one more and one less counting to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number representing and using number bonds and related subtraction facts within 20 	
Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> Identify the number that is one more than a number Identify the number that is one less than a number Count on to 100 and beyond in ones from any number Count back from 100 and beyond in ones from any number Know addition and subtraction facts to and from 10. Know addition and subtraction facts within 10 Know addition and subtraction facts to and from 20 Know addition and subtraction facts within 20. 	One more, one less Count on, count back One hundred Number bonds/ number facts Addition facts/ subtraction facts Fact family	<p>Note: Curriculum time has been prioritised to ensure all pupils secure a deep understanding of the age related expectations for the Number strands of the Year 1 Programme of Study. The key concepts for this unit are the same as the other Stage 1 'Calculating: addition and subtraction I' unit but this unit should be taught with an increased emphasis on developing pupils' reasoning skills, solving more complex problems and using explicit misconceptions and mistakes to deepen and challenge pupils' understanding.</p> <p>Further guidance on teaching for mastery can be found in the 'Introduction' of the NCETM: NC Assessment Materials (Teaching and Assessing Mastery) resources.</p>
Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> I'm thinking of a number. It is 1 more / less than 36. What number am I thinking of? Convince me that 1 more / less than 24 is 25/23. Kenny says that one less than 55 is 52. Is he correct? I will clap where a number is missing: 78, 79, 80 ... clap ... 82, 83, 84. What number did I miss? If I know that $3 + 7 = 10$, what else do I know? What facts can you tell me from this array? 	KM: One more/one less KM: Pause it KM: Stand up if you are... KM: Fact families: Use practical apparatus (arrays) to explore related number facts. For example fact family puzzles (which pieces combine to reach the target number), coat hanger and pegs, flip flaps, with different target amounts (and different combinations of coloured counters; i.e. 2 red and 4 blue), the ITP number facts and triominoes (see example) <p>Learning review NCETM: NC Assessment Materials (Teaching and Assessing Mastery)</p>	 <ul style="list-style-type: none"> Some pupils might count the number that they are starting from as one of the numbers in the count when adding on or counting back. Some pupils may appear to be counting confidently but they may just be mimicking the rhythm of the counting pattern. Ensure they are confident also in counting over the tens boundaries and over the one hundred boundary (as some pupils may say 99 and then refer back to 20) When exploring related number facts some pupils may just manipulate the numbers and record incorrectly. For example instead of understanding that they need to subtract from the largest number (for example $10 - 6 = 4$) they may move the numbers around because they think they are related (for example $6 - 4 = 10$).



Key concepts (National Curriculum statements)

- read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$

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

Possible themes	Possible key learning points	
<ul style="list-style-type: none"> Explore ways of writing mathematical statements Solve addition and subtraction problems 	<ul style="list-style-type: none"> Solve problems involving: <ul style="list-style-type: none"> reading, writing and interpreting mathematical statements involving addition (+), subtraction (−) and equals (=) signs adding and subtracting one-digit and two-digit numbers to 20, including zero one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$ 	
Prerequisites	Mathematical language	Pedagogical notes
<ul style="list-style-type: none"> Know the symbols '+', '-' and '=' Know the language of addition Know the language of subtraction Read statements involving the symbols '+', '-' and '=' involving numbers up to 20 Interpret statements involving the symbols '+', '-' and '=' involving numbers up to 20 Write statements involving the symbols '+', '-' and '=' involving numbers up to 20 Solve calculations involving numbers up to 20 given statements using the symbols '+', '-' and '=' Solve missing number problems involving numbers to 20 given statements using the symbols '+', '-' and '=' <p>Add and subtract one- and two-digit numbers to 20, including zero</p>	<p>Add, subtract Count on, count back More, less Plus, minus, total, sum Difference between Equal, equal to</p> <p>Notation The symbols '+', '-' and '='</p>	<p>Note: Curriculum time has been prioritised to ensure all pupils secure a deep understanding of the age related expectations for the Number strands of the Year 1 Programme of Study. The key concepts for this unit are the same as the other Stage 1 'Calculating: addition and subtraction II' unit but this unit should be taught with an increased emphasis on developing pupils' reasoning skills, solving more complex problems and using explicit misconceptions and mistakes to deepen and challenge pupils' understanding.</p> <p>Further guidance on teaching for mastery can be found in the 'Introduction' of the NCETM: NC Assessment Materials (Teaching and Assessing Mastery) resources.</p>
Reasoning opportunities and probing questions	Suggested activities	Possible misconceptions
<ul style="list-style-type: none"> Always / Sometimes / Never: The equals sign always comes at the end of the mathematical statement Convince me that $5 = 9 - 4$ Convince me that $12 + 7 = 19$ Show me a calculation which is equal to 7. And another, and another... 	<p>KM: Balance statements KM: Using a large number track or number tiles encourage the children to step along the number line to count on / back to aid addition / subtraction. Discuss whether pupils could step in different step sizes and use their knowledge of number bonds to 10 to help them.</p> <p>NRICH: I'm Eight NRICH: 2, 4, 6, 8 NCETM: Activity A NCETM: Activity C</p> <p>Learning review NCETM: NC Assessment Materials (Teaching and Assessing Mastery)</p>	<ul style="list-style-type: none"> Some pupils may first include the number that they count from, add to or subtract from (therefore they may be out by 1 each time) Some pupils may think that the equals sign means 'makes', or "is equal to" Some pupils may think that there always 'has to be an answer' when writing statements using the equals symbol

