| Stage 1 | Unit 1: Pattern Sniffing | |
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| | **Stage 1 core learning overview** | **Stage 2 extension overview** |
| | ➢ I can count beyond 100.<br>➢ I can count backwards from 100 in ones.<br>➢ I can read and write numbers to 100 using words<br>➢ I can read and write numbers to 100 using symbols<br>➢ I can count to 100 in 2s, 5s and 10s.<br>➢ I can find 1 more than any number less than 100.<br>➢ I can find 1 less than any number less than 100. | ➢ **count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward**<br>➢ **order and arrange combinations of mathematical objects in patterns and sequences**<br>➢ **recognise odd and even numbers**<br>➢ **recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables**<br>➢ **I can count in steps of 2s, and 5s from 0. I can talk about the number patterns.**<br>➢ **I can count in steps of 3s from 0.**<br>➢ **I can count forwards and backwards in 10s from any given number.**<br>➢ **I can recognise odd numbers.**<br>➢ **I can recognise even numbers.**<br>➢ **I can use numicon to make mathematical patterns.**<br>➢ **I can use mathematical resources to generate sequences.**<br>➢ **I can recall multiplication and division facts for 2s, 5s and 10s.** |
| **Key learning steps** | | **Key Vocabulary** |

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| 1. I can count to 100 in ones<br>2. I can count beyond 100.<br>3. I can count backwards from 100 in ones.<br>4. I can read and write numbers to 100 using words<br>5. I can read and write numbers to 100 using symbols<br>6. I can count to 100 in 2s, 5s and 10s.<br>7. I can find 1 more than any number less than 100.<br>8. I can find 1 less than any number less than 100. | | | Count on<br>Count back<br>Before<br>After<br>Less than<br>More than<br>Double<br><br>Multiple<br>Numerals<br>Steps<br>units<br>ones<br>tens<br>hundreds |
| **Show me... , And another ...** | **Convince me** | **What's the same? What's different? (Odd one out)** | **Always, sometimes, never** |
| ...how you can count to 10<br>...what comes after 5? Before 8?<br>..what I am counting in<br>... one more than...<br>...one less than ....<br>....what comes next in the pattern 2,4,6,_,_<br>...how you continue the sequence 5,10, 15, _, _ | That 84 comes next in the counting sequence 87,86,85, _, _<br><br>The next number will be in 6 (in the sequence is, 1,2,3,4,5,_,_ ) | 1,2,3,4 or 6,7,8,9 or 21,22,23,24 or 6,8,10,12<br><br>6,7,8,9 or 13,14,15,16 or 21,20,19,18 or 52,53,54,55 | When we count, 6 will come after 7<br><br>When I count in 2s from 0, I will not use a 5 digit at all |
| **Misconceptions** | | **Guidance** | |
| Children cannot tell the difference between 'teen' and 'ty' e.g. 19 and 90. Some children are not able to distinguish between the "teen" part of numbers.<br><br>Children see numbers as a long list of unrelated names/symbols - they need to see numbers as combinations of 1s and 10s to begin to use the structure of our number system to reduce the memory burden! | | Moving objects to exemplify secure knowledge of counting is beneficial to ensuring place value understanding. You want children to start to 'see' 12 as a '10 and a 2' so use objects to reinforce that representation during counting activities e.g. numicon or base 10 or Dienes.<br>Make sure students can read numbers from symbols and words as well as apply them to objects.<br>Ensure models and images of numbers vary and include number tracks, bead strings, numicon, hundred squares and number lines.<br>Ensure starting numbers for counting on are varied.<br>Place value to 10 will be imperative to securely understand before bridging 10. | |
| **Activities** | | **Show me what you know** | |

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| Read and write numbers from 1 to 20 in numerals and words<br><br>NRICH: What's in a Name? **<br>NRICH: Count the Digits *<br><br><br>These links will consolidate Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens<br>NRICH: Writing Digits *<br>NRICH: Shut the Box *<br>NRICH: Biscuit Decorations *<br>NRICH: Grouping Goodies *** | Click here to access files in Google drive |

| Stage 1 | Unit 2: Investigating Number Systems | |
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| | **Stage 1 core learning overview** | **Stage 2 extension overview** |
| | ➢ read and write numbers from 1 to 20 in numerals and words.<br>➢ identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least | ➢ **read and write numbers to at least 100 in numerals and in words**<br>➢ **recognise the place value of each digit in a two-digit number (tens, ones)**<br>➢ **identify, represent and estimate numbers using different representations, including the number line**<br>➢ **use place value and number facts to solve problems**<br>➢ **compare and order numbers from 0 up to 100; use <, > and = signs** |

| Key learning steps | Key Vocabulary | |
|---|---|---|
| 1. I can read and write numerals and words to 10.<br>2. I can read and write numerals and words to 20.<br>3. I can say the number that is one more or less than a given number to 20<br>4. I can say how many digits a number has<br>5. "I can represent any number up to 20 using:<br>- unifix cubes oe<br>- a number line<br>- a hundred square<br>- numicon<br>- cuisenaire rods"<br>6. I can count forwards and backwards to 20 from any number using a number line or hundred square.<br>7. I can compare two numbers or amounts up to 20 by saying ... is more than ... or .... is less than .... or .... is equal to .....<br>8. I can compare three numbers or amounts up to 20 and say which is the most and which is the least. | counting on / in<br>counting back /from/to<br>same as<br>equal<br>more than<br>less than<br>between<br>digit | how many<br>pattern<br>before / after<br>units / ones<br>tens / teens<br>order<br>most<br>least |

| Show me... , And another ... | Convince me | What's the same? What's different? (Odd one out) | Always, sometimes, never |
|---|---|---|---|
| ... the number eight/seventeen in symbols | ...that 14 is more than 11 | 9, 14, 16, 13 | Numbers with two digits are bigger than numbers with one digit |

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| ... the number 9/12 in words<br><br>... how we can represent the number six/fifteen using<br>- counting bears<br>- unifix cubes<br>- the beadstring<br>- the dienes rods<br>- the cuisenaire rods<br>- the numicon<br>- the hundred square<br>- the number line<br><br>... where 8 would be on this paper strip that goes from 0-10? where would it be if the strip went from 0-20?<br><br>...which is greater 7 or 17?<br><br>... which is fewer (less), 16 or 13?<br><br>... of the numbers 8, 15, 13 which is the most? the least? | ... that 13 is one more than 12<br><br>... that these numbers are in order of size 4, 12, 18<br><br>... that 17 is the most of the set 13, 17 and 10 | eight, 8, ////////, 18<br><br>12, 13 ,14, 16<br><br>four, fourteen, 4, 14 | To find 'one more' than a number, just change one digit |

| Misconceptions | Guidance |
|---|---|
| Children sometimes forget about 0 or think that is 'further away' from 1 than 2 is.<br><br>Children confuse 0 as a the number with the place holder role - this is true for all numbers e.g. 1 as a ten or as a one | Ensure children can read and write numbers to 10 before starting learning steps - these constitute memorised facts that need to be quickly recalled upon sight of the digit, the word or that number of objects.<br><br>Teach the model that numbers 0-10 can be represented on their hands. |

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| Children find it hard to 'see' numbers above 10 as combinations of 10s and 1s - overcome this by representing them in this way!<br><br>If you go past 20, beware children confusing tens and teens e.g. fourteen and forty or 14 and 40.<br><br>Children sometimes record numbers backwards e.g. they write 15 as 51 - this can be simply a slip but it can indicate a lack of awareness of the placing of the tens first, then the ones | Ensure vocabulary from ELGs in secure and don't assume knowledge of basic maths vocab can be used and applied.<br><br>Model counting from 0 and use of 0 as a place holder - try to distinguish between this use.<br><br>When representing numbers from 10 to 20, try to do so using a representation that emphasises the place value i.e. show 14 as a 10 and 4 and not just as 14 separate ones. This will help children to begin to understand that when you see a '1' you need to know where it is to interpret its meaning. Beadstrings are a good bridge from a number track to a number line as they maintain the cardinality of the numbers but indicate a continuous approach. They also emphasise the 'specialness' of 10.<br><br>Don't limit yourself to one preferred representation - encourage children to use all the different equipment to show the numbers they are learning so that they develop a rounder and more secure concept of each number.<br><br>Develop childrens' quick recognition of numbers 1-10 using a tens-frame. |
| **Activities** | **Show me what you know** |
| NRICH: Writing Digits *<br>NRICH: Shut the Box *<br>NRICH: Biscuit Decorations *<br>NRICH: Grouping Goodies ***<br>NRICH: Making Sticks **<br>NRICH: Robot Monsters *<br>NRICH: Dotty Six *<br>NRICH: All Change *<br>NRICH: What's in a Name? **<br>NRICH: Count the Digits * | Click here to access files in Google drive |

| Stage 1 | Unit 3: Solving Calculation Problems | |
|---|---|---|
| | **Stage 1 core learning overview** | **Stage 2 extension overview** |
| | ➢ represent and use number bonds and related subtraction facts within 20<br>➢ add and subtract one-digit and two-digit numbers to 20, including zero<br>➢ read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs | ➢ **recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100**<br>➢ **"add and subtract numbers using concrete objects, pictorial representations, and mentally, including:**<br>**- a two-digit number and ones**<br>**- a two-digit number and tens**<br>**- two two-digit numbers**<br>**- adding three one-digit numbers"**<br>➢ **show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot** |

| Key learning steps | Key Vocabulary | |
|---|---|---|
| 1. I can recall all addition / subtraction facts for all numbers to 10<br>2. I can recall all addition / subtraction facts for all numbers to 20<br>3. I can calculate the value of a missing number in an addition to 10.<br>4. I can produce number stories involving addition and subtraction to 10 and then 20, recording them using the mathematical symbols +, -, =<br>5. I can calculate the value of a missing number in an addition to 20<br>6. I can find the difference between numbers to 10 and then by counting on a number line.<br>7. I can find the difference between numbers to 20 by counting on a number line<br>8. I can use inverse relationships to solve missing number subtraction calculations to 20 | add<br>and<br>more<br>make<br>sum<br>total<br>altogether<br>score<br>double<br>one more<br>two (ten) more | how many more?<br>take (away)<br>leave<br>how many left?<br>one less<br>two less<br>ten less<br>how many fewer<br>difference between<br>is the same as<br>number sentence |

| Show me... , And another ... | Convince me | What's the same? What's different? (Odd one out) | Always, sometimes, never |
|---|---|---|---|
| ... two numbers that are easy to add<br>... two numbers that are hard to add | ... that if I count on 5 from 7, I get the same answer as if I counted all of the | 3, 7, 2, 8<br>6+4, 5+5, 3+8, 1+9 | Addition facts to 20 can be found using addition facts to 10 |

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| ... two numbers that are easy to subtract<br>... two numbers that are hard to subtract<br>... two numbers with a sum of 10<br>... two numbers with a sum of 7<br>... two numbers with a difference of 4<br>... two numbers with a difference of 7 | 5 and the 7<br><br>... there are lots of pairs of numbers with a difference of 3<br><br>... 18 is four more than 14 | 9-5, 8-4, 10-6, 7-4 | Addition makes a number larger<br>Subtraction makes a number smaller |
| **Misconceptions** | | **Guidance** | |
| Children struggle to interpret whether to add or subtract from the language used.<br><br>Children can find 'How many more/less?' particularly troublesome as it relates to ordinal values of numbers and relationships.<br><br>Children often do not see difference as a representation of subtraction because take away is emphasised so much.<br>They need to see subtraction represented in this way also to challenge this. | | Ensure you use a range of language to imply addition or subtraction to help children recognise when to add and when to subtract.<br>Make use of total, sum, add, and, ... more than, all, altogether and the symbols for these too!<br>For subtraction include: subtract, take away, difference, .... less than, ..... fewer and the symbolic versions.<br><br>This unit is trying to develop the behaviours and understanding of addition and subtraction as well as the notation so make sure you give children opportunities to use practical objects to carry out their calculations as well as tools to record what they have done at the same time. Try to model addition as both aggregation (finding the total by combining two set) AND augmentation (adding on a number to a set). https://www.ncetm.org.uk/resources/24134<br>The same is true for subtraction where you should model both finding the difference between two sets and taking away from a set.<br><br>Address confusion caused by the 'how many more' or 'how many fewer' questions that relate to the ordinal values by counting forwards and back on a daily basis, supported with practical resources.<br><br>The recall elements at the start of this unit can be addressed a few at a time - you may want to start teaching children about commutativity so that they don't have to remember all the number facts both ways round! | |
| **Activities** | | **Show me what you know** | |

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| NRICH: 2,4,6,8 ***<br>NRICH: How Do You See it? *<br><br>NRICH: Domino Sorting *<br>NRICH: One Big Triangle *<br>NRICH: Ladybirds in the Garden **<br>NRICH: Number Lines *<br>NRICH: Pairs of Numbers *<br>NRICH: Weighted Numbers *<br>NRICH: Butterfly Flowers *<br><br>NRICH: Two Dice *<br>NRICH: Find the Difference **<br>NRICH: Sort Them Out (1) * | Click here to access files in Google drive |

| Stage 1 | Unit 4: Exploring Shape | |
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| | **Stage 1 core learning overview** | **Stage 2 extension overview** |
| | ➢ "recognise and name common 2-D and<br>➢ 3-D shapes, including:<br>➢ - 2-D shapes [for example, rectangles (including squares), circles and triangles]<br>➢ - 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]" | ➢ **"identify and describe the properties of**<br>➢ **2-D shapes, including the number of sides and line symmetry in a vertical line"**<br>➢ **"identify and describe the properties of**<br>➢ **3-D shapes, including the number of edges, vertices and faces"**<br>➢ **compare and sort common 2-D and 3-D shapes and everyday objects** |

| **Key learning steps** | **Key Vocabulary** | |
|---|---|---|
| 1. I can recognise a circle among other shapes<br>2. I can recognise a square among other shapes<br>3. I can recognise a triangle among other shapes<br>4. I can recognise a cube among other shapes<br>5. I can recognise a cuboid among other shapes<br>6. I can recognise a sphere among other shapes<br>7. I can recognise a pyramid among other shapes<br>8. I can sort shapes and name them from a group | circle<br>square<br>triangle<br>rectangle<br>cube<br>cuboid<br>cylinder<br>sphere<br>pyramid | sort<br>shape<br>sides<br>edges<br>corners<br>vertices<br>flat<br>2D<br>solid<br>3D |

| **Show me... , And another ...** | **Convince me** | **What's the same? What's different? (Odd one out)** | **Always, sometimes, never** |
|---|---|---|---|
| ... a triangle? a square? a circle?<br>.. a cube? a cuboid? a pyramid?<br><br>... a 2D shape<br>... a 3D shape<br><br>... a shape with only straight edges | ... that this is a circle<br><br>... that this is definitely a cube<br><br>... that this is a 3D shape | ... square and rectangle<br><br>... cube and cuboid<br><br>... triangle and square<br><br>... triangle and circle | ... 2D shapes have 3 sides<br><br>... shapes starting with c can roll<br><br>... triangles have three sides |

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| ... a shape beginning with c<br><br>... the name of this shape<br><br>... a shape that you don't know the name of....<br><br>... a shape that will roll<br><br>... a shape that can be stacked<br><br>... how you could sort these shapes into 2 groups - what rule did you use? | | | |

| **Misconceptions** | **Guidance** |
|---|---|
| Children may confuse flat and solid shapes and fail to see the difference between the two types.<br><br>Important to use terms as curved as children will want to call curved edges- circle edges.<br><br>Children may confuse a cube with a square because of the relationship between these- language reinforcement from the start using faces, edges, vertices etc.<br><br>Squares and rectangles can be confused - bear in mind that later we want children to see a square as a 'special case' of a rectangle | It is good practice to use items from home such as football, teabag box, coke can to make solid shapes real and meaningful in context.<br><br>Have examples of squares and rectangles from around the school as well as the shape in various positions.<br>It is important that you vary the orientation so that children do not 'presume' that the shape has to be a certain way up to qualify as a triangle, for example.<br><br>Constantly reinforce the properties of these shapes, even though the Stage 1 statements are only about naming and recognising.<br>For example, focus on same length sides; bring in term equal as same as.<br>Repeat with circle as a flat shape.<br>Children can make models during child initiated play using plasticine, D&T- making nets for a box (Mother's day gift), shapes in sand pit, on playground etc..<br>Have large boxes, wooden bricks for children to build with so that they can explore the properties in a physical context. |

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| | Shapes can used to develop pattern making and in art. Feely bags. Children to be the teacher and use the feely bag. |
| **Activities** | **Show me what you know** |
| NRICH: Shaping It *<br>NRICH: What's Happening? * | Click here to access files in Google drive |

| Stage 1 | Unit 5: Generalising Arithmetic | |
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| | **Stage 1 core learning overview** | **Stage 2 extension overview** |
| | ➢ represent and use number bonds and related subtraction facts within 20<br>➢ add and subtract one-digit and two-digit numbers to 20, including zero<br>➢ solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ☐ – 9<br>➢ read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs | ➢ **recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100**<br>➢ **"add and subtract numbers using concrete objects, pictorial representations, and mentally, including:**<br>**- a two-digit number and ones**<br>**- a two-digit number and tens**<br>**- two two-digit numbers**<br>**- adding three one-digit numbers"**<br>➢ **recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.**<br>➢ **show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot** |

| Key learning steps | Key Vocabulary | |
|---|---|---|
| 1. I can use a range of apparatus to add numbers with answers up to 20<br>2. I can use a range of apparatus to add numbers with answers up to 20<br>3. I can add by counting on<br>4. I can add and subtract 0,1,2,3,4,5,6,7,8,9 to numbers up to 20.<br>5. I can use objects to take away a small number from any number up to 10/20<br>6. I can make numbers to 20 in many different ways.<br>7. I can record an addition or subtraction number sentence and tell you what it means.<br>8. I can use the signs +, -, and = when I write addition and subtraction sentences.<br>9. I can solve a problem or puzzle involving addition and subtraction using apparatus or pictures and explain how I did it. | add<br>+<br>addition<br>and<br>make<br>total<br>altogether<br>-<br>subtract<br>subtraction | take (away)<br>leave<br>=<br>equals<br>sign<br>is the same as<br>number sentence |

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| Show me... , And another ... | Convince me | What's the same? What's different? (Odd one out) | Always, sometimes, never |
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| ... how we can find the total of 7 cars and 4 cars<br><br>... how you can work out 14 - 5<br><br>... how we can find the difference between Joe's 8 teddies and Amy's 15 teddies.<br><br>... two numbers that add up to 20<br><br>... two numbers that have a difference of 2<br><br>... a story that you would solve by using this addition 16 + 7 = 23, and another... | ... that 17 is four more than 13<br><br>.. that we can make more than 20 from these numbers<br><br>...I have 8 pencils. I take away 3 and there are 5 left. | 5 cubes take away 1 cube, and 7 cubes take away 3 cubes<br><br>5 + 6 and 8 + 3 | 7 + 2 is the same as 2 + 7 |

| Misconceptions | Guidance |
|---|---|
| Children sometimes miss out 0 when counting or when thinking about numbers | When starting addition children will first count all. To move them on from this to counting on, cover and label the first set 'You know this is five ....6,7,8'. This can then move to a hidden set with a label as the start of recording using |

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| When they count on, children sometimes start on the current number and not the next one - try 'putting the number in our head' and then counting on from....<br><br>Children confuse the process of adding and subtracting with each other - manipulatives help to avoid this as an action can be associated with the process then<br><br>Look out for the confusion of 6 and 16, for example | numbers and symbols.<br><br>When introducing subtraction ensure you model as a starting number of objects followed by a removal of the required number to 'leave' the answer. Do not count out the number to be subtracted in addition to the starting set. Also ensure you begin to expose children to the idea that 'difference' is subtraction also - they need BOTH representations i.e. take away AND difference<br><br>Focus on learning bonds off by heart so that these can be drawn upon really quickly when calculating.<br><br>As children progress, try to use more abstract models with them e.g. move from actual objects, to counting bears, to unifix, to numicon and cusinaire. Ultimately you want them to be using abstract objects that cannot be 'separated' into ones.<br><br>Ensure you expose children to the word versions of numbers also! |
| **Activities** | **Show me what you know** |
| NRICH: Two Dice *<br>NRICH: Find the Difference **<br>NRICH: Sort Them Out (1) * | Click here to access files in Google drive |

| Stage 1 | Unit 6: Reasoning with Measures | |
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| | **Stage 1 core learning overview** | **Stage 2 extension overview** |
| | ➢ recognise and know the value of different denominations of coins and notes | ➢ **recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value**<br>➢ **find different combinations of coins that equal the same amounts of money**<br>➢ **solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change** |

| Key learning steps | Key Vocabulary |
|---|---|
| 1. I can recognise 1p, 2p coins and know that one 2p coin is equivalent to two 1p coins<br>2. I can select 1p and 2p coins to make amounts up to 10p<br>3. I can recognise 5p, 10p coins and know that one 10p coin is equivalent to two 5p coins, five 2p coins or ten 1p coins and that one 5p coin is equivalent to five 1p coins<br>4. I can recognise 20p, 50p, 100p = £1 coins and know their equivalences in terms of 1p and 10p coins<br>5. I can select 1p, 2p, 5p and 10p coins to make amounts up to 50p and select 10p, 20 and 50p coins to make multiples of 10p up to £1<br>6. I know that £1 is equivalent to five 20p or two 50p coins.<br>7. I can make amounts that are multiples of 10p<br>8. I can recognise £5, £10 and £20 notes, know their equivalence in terms of £1 coins, and that £10 = 2 x £5, £20 = 2 x £10 = 4 x £5 | £/p<br>amount<br>coin<br>money<br>notes<br>pence<br>penny<br>pound |

| Show me... , And another ... | Convince me | What's the same? What's different? (Odd one out) | Always, sometimes, never |
|---|---|---|---|
| How to make 7p, 15p, 20p in two ways etc | that five 2p coins is worth the same as two 5p coins | Which amount is the odd one out: 2p, 5p, 20p, 30p (2 coins) | Money in notes is worth more than money in coins |

| Misconceptions | Guidance |
|---|---|
| Confusion of £ and pence; having insufficient grasp of number; not understanding concept of money | At this stage, children should be familiar with numbers up to 20 (from EYFS) and usually higher. The coins are a concrete representation of number. It is critical to provide lots of experience in exchanging larger denomination coins for single 1p coins. Eg, starting with 23 x 1p coins, a child might group in |

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| | fives/tens to get 4 x 5p or 2 x 10p plus 3 x 1p or 2p + 1p. |
| **Activities** | **Show me what you know** |
| | Click here to access files in Google drive |

| Stage 1 | Unit 7: Discovering Equivalence | |
|---|---|---|
| | **Stage 1 core learning overview** | **Stage 2 extension overview** |
| | ➢ recognise, find and name a half as one of two equal parts of an object, shape or quantity<br>➢ recognise, find and name a quarter as one of four equal parts of an object, shape or quantity<br>➢ 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 | ➢ **recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity**<br>➢ **write simple fractions for example, 1/2 of 6 = 3 and recognise the equivalence of 2/4 and ½**<br>➢ **identify, represent and estimate numbers using different representations, including the number line** |

| Key learning steps | Key Vocabulary |
|---|---|
| 1. I can find half of a small number of objects by sharing them into two equal groups.<br>2. I can find half of a small number of objects by grouping them into 2s and counting how many groups I have.<br>3. I can show half of a shape or object by dividing it into two equal parts.<br>4. I can represent a half using a range of models and images.<br>5. I can find a quarter of a small number of objects by sharing them into four equal groups.<br>6. I can find half of a small number of objects by grouping them into 4s and counting how many groups I have.<br>7. I can show a quarter of a shape or object by dividing it into four equal parts.<br>8. I can represent a quarter using a range of models and images, including as half of a half. | half<br>halve<br>equal<br>parts<br>share<br>group<br>dividing<br>quarter<br>fourth<br>share equally<br>equal groups<br>equal to |

| Show me... , And another ... | Convince me | What's the same? What's different? (Odd one out) | Always, sometimes, never |
|---|---|---|---|
| ... how you can find half of these cubes<br><br>... how you can find half of these counters by sharing them into two groups | ... that a quarter of 20 must be 5<br><br>... that I get the same result when I halve by sharing as I do when I halve by grouping | ... sharing and grouping<br><br>... half and quarter<br><br>... 2 shapes - one showing 1/4 and one showing four pieces but not all equal | ... when I find half of a number, I get a bigger answer than if I find a quarter of the same number<br><br>... half of zero is zero |

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| ... how you can find half of these counters by putting them into groups of two<br><br>... half of this shape<br>.... half of this shape in a different way<br><br>... how you can find a quarter of 16 in two different ways | ... that a quarter of 16 is the same as half of 8 | | ... sharing is quicker than grouping<br><br>... you cannot find half of 7 |

| Misconceptions | Guidance |
|---|---|
| Children think a half of a shape has to be represented with a vertical cut i.e. a left and right piece<br><br>Children do not realise the importance of dividing a shape/object into EQUAL parts to find a half or a quarter - they may divide it into two or four unequal parts and claim that one of them is a half or a quarter.<br><br>Children tend to focus on the sharing model for halving and quartering (i.e. dealing out into 2 or 4 groups) and do not think about the grouping model as an alternative (which is what they will need later for larger scale division and fractions).<br><br>Children stick to one particular representation of a half or a quarter (often the circular one) and do not recognise other models or images as also being a half or a quarter. | Children will need to experience finding half then quarter with a variety of practical resources and related to real life experiences before moving to pictorial and symbolic representations.<br><br>Try to use as many different objects, shapes and quantities as you can when working to find a half - begin to distinguish between finding a half of an object by dividing it into EQUAL parts and finding half of a quantity or number by sharing or grouping.<br>Later work with division and fractions needs children to understand the TWO processes of sharing and grouping as different ways for dividing - make sure you match your language appropriately so that children understand the difference between the two approaches and that they should give the same answer!<br><br>Recognising the quantity in a set (subtilising) is an important step to efficient calculation and estimation. It is, for example, recognising the pattern of six on a dice without counting. This can be built into this unit to help children quickly count before halving.<br><br>When finding a quarter of an amount, draw attention to the division into four equal parts (and note that children will often only hear 'four parts' here and |

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| | forget about the need for them to be equally sized) as well as to the relationship between a quarter and a half.<br><br>As you move to finding a quarter of a quantity or number, again make reference to sharing and to grouping as different structures for carrying out this process. |
| **Activities** | **Show me what you know** |
| NRICH: A Bowl of Fruit http://nrich.maths.org/218 | Click here to access files in Google drive |

| Stage 1 | Unit 8: Investigating Statistics | |
|---|---|---|
| | **Stage 1 core learning overview** | **Stage 2 extension overview** |
| | ➢ measure and begin to record the following:<br>- lengths and heights<br>- mass/weight<br>- capacity and volume<br>- time (hours, minutes, seconds) | ➢ **interpret and construct simple pictograms, tally charts, block diagrams and simple tables**<br>➢ **ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity**<br>➢ **ask and answer questions about totaling and comparing categorical data** |

| Key learning steps | Key Vocabulary | |
|---|---|---|
| 1. I can say if an object is big or small or tall or short or long or short or heavy or light.<br>2. I can say which object is bigger/taller/longer/heavier (or smaller/shorter/lighter)<br>3. I can make a prediction about a length or weight or capacity<br>4. I can record and measure a length by positioning a ruler correctly and reading the amount<br>5. I can record and measure a weight by using scales and reading the amount.<br>6. I can record and measure a capacity by repeatedly filling the object and counting this.<br>7. I can measure and record a time in seconds or minutes using a stop watch.<br>8. I can decide which object to choose to measure something. | object<br>big<br>larger<br>small<br>tall<br>short<br>long<br>heavy<br>light<br>bigger<br>larger<br>smaller<br>taller<br>shorter | longer<br>heavier<br>lighter<br>ruler<br>metre rule<br>tape measure<br>scales<br>stop watch<br>compare<br>centimetres<br>metres<br>grams<br>kilograms<br>seconds<br>minutes |

| Show me... , And another ... | Convince me | What's the same? What's different? (Odd one out) | Always, sometimes, never |
|---|---|---|---|
| ... an object that is taller than a cat<br>... an object that is heavier than a cat<br>.... an object that could be used to measure the height of this table | ... that this object weighs less than 100g<br>... that this object is has a length of 29cm | (Show 4 objects) eg Pencil, book, cup, bag<br><br>m, cm, kg, litre | Large containers have a greater capacity than smaller ones<br><br>I should measure the length of a |

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|---|---|---|---|
| ... an object that could be used to measure the weight of this cup<br>... the units of measurement that this equipment uses (scales, ruler etc) | ... that this object is taller than this one | m, cm, mile, hands | string in centimetres |

| Misconceptions | Guidance |
|---|---|
| Children often struggle to bridge their understanding from the word descriptions of measures to a numerical approach. They can articulate whether an object is large or larger but cannot give this a number by measuring.<br><br>Children do not always measure an object from 0 - they may not line up an object with the end of a ruler or reset scales before measuring.<br><br>When measuring a longer length, children do not always realign the ruler correctly each time.<br><br>Children get confused between the objects that are used to measure and the units of measurement that these make use of.<br><br>Children do not always realise that units can be formal or informal e.g. length can be measured in handspans or in cm - they do not always include units at all in their answers.<br><br>There is a tendency for children to consider capacity to be a measure of liquid rather than of the space inside an object. | There is a need to be very practical with this unit which focuses on both the skills of measuring and of recording the results.<br><br>Teachers need to bridge the gap between the word descriptions of measures and the allocation of numeric values to measurement. There is a need to model different units.<br><br>Make sure children have opportunities to select their own equipment for measuring and to then reflect on what the units should be and whether this was a sensible choice.<br><br>Equipment needs to be used correctly and this should be modelled with particular focus on measuring from 0, reading accurately and recording carefully.<br><br>When recording measurements, children should include the units and practise doing this using a list or tabular format if possible. Where the units do not match, the teacher needs to draw children's attention to this to make them consider how to address this. |
| **Activities** | **Show me what you know** |
| | Click here to access files in Google drive |

| Stage 1 | Unit 9:Solving Number Problems | |
|---|---|---|
| | **Stage 1 core learning overview** | **Stage 2 extension overview** |
| | ➢ 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 | ➢ **calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs**<br>➢ **show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot**<br>➢ **solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts** |

| **Key learning steps** | **Key Vocabulary** | |
|---|---|---|
| 1. I can represent a multiplication problem as 'lots of the same thing' using groups of objects.<br>2. I can represent a multiplication problem using an array (of objects) and find the total by counting (efficiently).<br>3. I can represent a multiplication problem in a range of ways<br>4. I can recognise a multiplication problem (repeated addition or scaling) and solve it using representations with support.<br>5. I can represent a division problem by sharing.<br>6. I can represent a division problem by grouping.<br>7. I can represent a division problem by grouping objects into an array.<br>8. I can identify and then solve a division problem using sharing or grouping with support. | count<br>objects<br>number<br>multiplication<br>multiplied by<br>lots of<br>groups of<br>scaling<br>twice | ... times as ...<br>groups of share<br>share / sharing<br>group / grouping<br>array<br>share equally<br>division<br>problem<br>represent |

| **Show me... , And another ...** | **Convince me** | **What's the same? What's different? (Odd one out)** | **Always, sometimes, never** |
|---|---|---|---|
| ... 3 groups of 2<br><br>.... 6 lots of 2 | ... that 5 x 3 = 315<br><br>... that 8 lots of 2 is 16 | 2 x 6, 5 x 2, 10 x 1, 3 x 4<br><br>2 10ps, 10 2ps, 2 x 10, 10 x 2, 2 groups of 10, 10 groups of 2, 2 | |

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| ... 5 multiplied by 3<br><br>... the amount twice as big as 10<br><br>... how you show 2 multiplied by 3 in as many ways as possible<br><br>... the array for 5 groups of 2<br><br>... 12 shared into 2 groups<br>... 12 shared into groups of 2<br><br>... the array for 8 shared into groups of 2 | ... that 18 shared between 2 is 9<br><br>... that twice 6 is 12<br><br>... the array for 5 x 1 is just a line | numicon 10s, 10 numicon 2s | |

| **Misconceptions** | **Guidance** |
|---|---|
| Children sometimes struggle to interpret a problem and find the key numbers before deciding what do with them. They cannot unpick the clues within the problem.<br><br>Children may find it hard to read a formal multiplication e.g. 2 x 5 correctly - note that in stage 1 it is acceptable to stick to more informal language e.g. groups of<br><br>Children tend to use the 'lots of' representation [repeated addition] of multiplication much more than scaling.<br><br>Children tend to stick to their favourite representations - they may overly rely on, for example, numicon when a bead string or an array could be more helpful.<br><br>Children confuse the processes of sharing (into a given number of piles - like dealing cards - and seeing how many objects are in each pile at the end) and grouping (counting out groups of a given number and seeing how many groups | In Stage 1 there is an expectation that children will use and encounter the language of multiplication, but not that they will themselves use the notation e.g. you might expect them to say lots of rather than multiply by and to recognise 2 x 3 but not record it themselves.<br><br>Encourage children to rearrange objects into equal groups so that objects are not missed or counted twice. You can use counters, unifix or numicon for this type of activity. Gradually you want to encourage them to 'organise' their groups so that you can see straight away if there are any extra or missing objects --> this will lead you nicely on to the array as way of neatly showing your groups (each group is a row). Don't forget the order and vocalisation of multiplication i.e. 2 x 4 is 2 multiplied by four so we would expect to see groups of 2 shown four times (and not the other way around).<br><br>Make sure that children have plenty of practical experience of grouping. Egg boxes, cake trays and chocolate boxes can be a concrete experience of an array. |

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| you end up with). Note that they may also tend to allow one to dominate and therefore not gain much practice with the other.<br><br>Children will not always naturally notice the connection between multiplication and division - they need you to draw these properties out to make the links clearer. | Also expose children to examples of scaling e.g. doubling or tripling a length or making something ten times bigger.<br><br>Try also using a bead string as an alternative to counters or unifix as this is a useful pre-cursor to the number line. Children can represent repeated addition very well like this as well as division - by counting out and then grouping. You want the children to be as flexible as possible in using different representations to show the calculation.<br><br>Use your earlier and continued work on counting in 2s, 5s and 10s to support children in counting efficiently with groups of objects or the rows of an array. e.g. once 2 x 7 array has been produced, they can count the total in 2s as 2, 4, 6, 8, 10, 12, 14.<br><br>Note that as per the calculation policy, the array a x b should be represented as a columns by b rows (i.e. a across and b down). You should introduce this now, even though the formal array is challenging for stage 1, so that there is no 'unlearning' to be done later. You can introduce it subtly and implicitly at this stage - make sure you consistently represent multiplication in that way.<br><br>Try to use a single 'groups of objects' and then later 'array' representation to show and talk through both multiplication AND division facts - for example a 5x4 array shows you that 5x4 = 20 (and you can give this a context within a problem) but it also tells you something about 20 divided by 5 because it shows how many groups of 5 will make 20. In Stage 2 we can use it to show the whole fact family!<br><br>When approaching problems, try to look at the language that tells you what you should be doing - model the calculation as you read the problem rather than all at the end. Try to represent problems in different ways (grouped objects, bead strings, arrays) to develop flexibility in the children. |
| **Activities** | **Show me what you know** |

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| NRICH: Using arrays http://nrich.maths.org/2466<br>Arrays PPT: http://topicbox.net/mathematics/multiplication/5112/<br>NRICH: Share Bears http://nrich.maths.org/2358/note | Click here to access files in Google drive |