|  | **Addition**  To be taught alongside each other **Subtraction** | | **Multiplication**  To be taught alongside each other **Division** | |
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| **Foundation 2** - **Using numbers to 20** | Teachers should model addition using a range of practical resources  When using fingers to model counting always begin with open palms, 1= left thumb through to 10= right thumb.  practice  4+3=7    When counting on, the link with calculating must be explicit:    +1 +1 +1 +1 +1 +1 +1 +1 +1 +1              0 1 2 3 4 5 6 7 8 9 10    0 add 1 equals 1, 1 add 1 equals 2, 2 add 1 equals 3…  Children should also experience counting in tens, five and twos. Starting and finishing at different numbers is important as this will help them with addition calculations as they progress.  First, children should ‘count all’ to combine two groups of objects. When this is secure, they will begin to count on. For example, when one group of objects is hidden. Then they will move on to full number sentences. Children should understand the = symbol as ‘the same as’.    “Add” “equals” **6**    **3**  “Add” “equals” **6**    **3 + 3 = 6** which the teacher models writing  10 9 8 7 6 5 4 3 2 1 0  STEP 1  STEP 2  STEP 3  Begin to relate the addition of doubles to counting on as well as showing the **inverse e.g. 6 – 3 = 3**  Bead strings or bead bars should be used to model addition.  8+2=10  As well as practical objects, children should use number tracks, progressing to number lines when understanding is secure.  Children are encouraged to develop a mental picture of the number system in their heads to use for calculation.  They develop ways of recording calculations using pictorial representations. | 10-3=7    Understand the concept of subtraction by comparing two objects to find difference, how many more or less e.g.    *There are eight biscuits*  *on this plate. Take three What is the difference I have 6 toy cars but*  *of the biscuits to eat. between the number of wanted to have seven.*  *How many biscuits are grey rabbits and the How many more cars do*  *left on the plate? number of white rabbits? I need to make seven?*  When counting back, the link with calculating must be explicit:  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1                Bead strings or bead bars can be used to illustrate subtraction:    **6-2=4**  Teachers should model subtraction using a range of practical resources. Begin to relate subtraction to taking away and counting how many are left. When using fingers to model counting back always use open palms; 10 represented by right thumb, to 1 on left thumb.  10 subtract 1 equals 9/ 1 less than 10 / 10 take away 1 equals 9  Children should also experience counting in tens, five and twos. Starting and finishing at different numbers is important as this will help them with subtraction calculations as they progress.  As well as practical objects, children should use number tracks, progressing to number lines when understanding is secure.  Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictorial representations.  “This is 4 more than 4”  C:\Users\Sal\Videos\FlipShare Data\Videos\VID00385.jpg  “This is 4 less than 8”  Children should begin to experience the language of ‘the difference’ using daily routines as a context for learning. For example, comparing the blocks to see how many packed lunches/ school dinners there are on a given day. | Children will experience equal groups of objects.  They will count in 2s and 10s and begin to count in 5s. They should be provided with practical opportunities and visual images eg: counting pairs of socks or counting in tens to find out how many fingers five children would have.    They will work on practical problem solving activities involving equal sets or groups.    5 10 15 20    “Four hands of 5 fingers is the same as 20 fingers” | Children will understand equal groups and share items out in play and problem solving. They will count in 2s and 10s and later in 5s.    Children should experience halving in context e.g. halving apples, sandwiches etc  Children should have opportunities to practice finding halves of numbers to 10 in practical activities.  Children should have opportunities to explore division by sharing objects out equally “One for you, one for me…”  Equipment:  Numicon  Counters  Beadstrings  Cubes  Numberlines  Number tracks  Number tiles  Coat hangers & pegs  Practical Counting equipment  Dishes/hoops  Socks/Gloves |
| **Y1** | bk4_ch2_rec3.  IMGP0194  Children should be encouraged to show pictorial recordings of their calculations including number sentences.  Bead strings or bead bars should be used to illustrate addition including bridging through ten by counting on 2 then counting on 3. e.g.8 + 5=8 + 2 + 3.  The children should use number tracks and number lines marked out in jumps of one and practical resources to support calculation. They may begin to use number lines marked out in jumps of five and ten.  Teachers will need to model the use of the number line. Children will then begin to use number lines, counting on in ones, to support their own calculations. The link between the bead bar and number line must be made explicit. Use to begin to illustrate that addition can be done in any order and to recognise that more than two numbers can be added.  Numicon should also be used to model bridging through ten by counting on 2 then counting on 3.  Numicon software should also be used during teacher led whole class and guided groups. Children should also have access to this independently both on the interactive whiteboard and on class computers and laptops.    IMGP0189  8 + 2 + 3 =13  Children must have access to a range of counters and resources such as to solve addition calculations. It is important that children are able to explore a range of resources and consider, **verbalise & reason** which is most appropriate for a given calculation. | There were 8 balloons, 2 popped. How many were left?’  Children need practical activities of ‘taking away’, that is finding how many are left from a collection of objects when some are removed.  Children also need practical activities of ‘finding the difference’, which involves making a comparison between the numbers in two groups of objects.    The bead bar and the number line should also be used to show that 8 – 5 means the ‘difference between 8 and 5’ or ‘the difference between 5 and 8’ and how many jumps they are apart.  Bead strings or bead bars can be used to illustrate subtraction including bridging through ten by counting back 3, then counting back 2  **13-5=8**  Use the language of ‘more than’, ‘less than’ and ‘difference between’, together.  Begin to use and show how to add or subtract 9 by adding or subtracting 10 and adjusting by 1. Refer to as ‘over jumping 10’.  **Visualising 10=9+1 9=10-1**  Children should then begin to use number lines to support their own calculations, counting back in ones. | Children will experience equal groups of objects.  They will count in 2s and 10s and 5’s.  They will work on practical problem solving activities involving equal sets or groups.  Children should experience doubling numbers in a range of contexts.      They should begin to understand multiplication as repeated addition and as an array in context e.g. eggs in a box and cakes in a tin.  Connective model: context, image and language and don’t forget the symbols!  e.g. 5 x 2 = 5 multiplied by 2 = 5 ‘2 times’ = 5+5  Make connections between arrays, number patterns and counting in 2’s, 5’s, 10’s.  Children will need to be taught the language of ‘rows’ and ‘columns’. The multiplication ITP is a good visual image. They should explore them in the environment.  CIMG6598 ANd9GcRlTfoXk52wjutJfkPPik21YaY4Pw7i1QuA5h8GxOVnEJLBsrCz | Children will understand equal groups and share items out in play and problem solving.    Children should experience halving numbers in a range of contexts. (Object, shape & quantity)      Children should experience finding, recognising & naming one half as one of two equal parts and one quarter as one of four equal parts.  CIMG6598  Make arrays to find division facts for ½ & ¼ |
| Y2 | Children should use number lines that are marked out in jumps of one and ten and learn which would be most appropriate for a given calculation.  Children will begin to use ‘empty number lines’ themselves starting with the larger number and counting on, keeping the first number whole.  Numicon and Base Ten should be used to support this. It is important that the visual image of these resources is related to the number line. Encourage children to use the language of **partitioning and bridging** when explaining their strategies.  **Counting on.**  First counting on in tens and ones.’ (jumping in 10’s)    Then helping children to become more efficient by adding the ones in one jump (by using the known fact 4 + 3 = 7).    Followed by adding the tens in one jump and the ones in one jump.  C:\Users\Sal\Videos\FlipShare Data\Videos\VID00380.jpg  Bridging through ten can help children become more efficient. (target 10)  C:\Users\Sal\Videos\FlipShare Data\Videos\VID00378.jpg  **Compensation**  Children should be taught when adding 9, it is easier to add 10 then subtract 1, modelling on a bead bar over jumping 10  **37 + 9 =?? 37 + 10 = 47 47 -1 = 46**  **Complementary addition.**  Children should understand solving word problems, such as ‘You need 10 marbles, but you only have 6, how many more do you need?’ Model on bead bar and number line… ‘How to find the missing number’ e.g. 10 = 6 + \_\_ | Children will use bead strings and numbered number lines to support  calculations. They should begin to use empty number lines. When subtracting, children should be taught to only partition the second number.  **Counting back:** First counting back in tens and ones.    Then helping children to become more efficient by subtracting the units in one jump (by using the known fact 7 – 3 = 4).  C:\Users\Sal\Videos\FlipShare Data\Videos\VID00377.jpg  **Followed by** subtracting the tens in one jump and the units in one jump.    Bridging through ten can help children become more efficient.    **Counting on:**  It is important that children experience finding the difference between 2 numbers by counting on. The difference ITP is a good visual image.    It is important that this is modelled using two bead strings, or two Numicon plates as shown in the picture above. Children should experience finding the difference in a range of contexts including height e.g. growth of two seedlings.  **Compensation** When subtracting 9, it is easier to subtract 10 then add 1, (model on a bead bar)  **37 - 9 =?? 37 - 10 = 27 27 + 1 = 28** | Children will develop their understanding of multiplication and use jottings to support calculation:  **Repeated addition**  5 times 3 = 5 x3 = 5 three times = Three groups of 5 =  5 + 5 + 5 = 15  On a bead bar:    And on a number line:    Children should know that 3 x 5 has the same answer as 5 x 3. This can also be shown on the number line.  15 = 5 x 3    15 = 3 x 5  **Arrays**  Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method. Children will need to be taught the language of ‘rows’ and ‘columns’. The **multiplication ITP** **is a good visual image**. They should explore arrays in the environment.  It is important to connect the array model to repeated addition using resources such as counters and show the link between more complex fractions of objects, numbers and quantities.    **Scaling**  Exploring concepts such as:  ‘This is twice as long as/  half as long as/  3 times as tall as.’ | Children will develop their understanding of division and use jottings to support calculation. They should make the link between counting in equal steps and grouping.  **Sharing ‘**6 sweets shared between 2 people, how many do they each get?’    Relate fractions to the sharing aspect of division through arrays and model the recording.  E.g. 8 ÷ 2 = half of 8.  C:\Users\Sal\Videos\FlipShare Data\Videos\VID00381.jpg  **Grouping ‘**There are 6 sweets, how many people can have 2 sweets each?’    ‘Crisps come in packs of 5, I have 20 children and each needs a packet. How many packs do I need to buy?’ 20 ÷ 5 = 4    5 5 5 5  **Repeated Subtraction**  15 ÷ 5 = 15 – 5 – 5 – 5 =  (3 groups of 5)    Children should be encouraged to use their known multiplication facts to work out division calculations.  The **bead bar** will help children with interpreting calculations like 12 ÷ 3 = as ‘How many 3’s equal 12?  Solve calculations using symbols to stand for unknown numbers and complete equations using **inverse** operations.  □ ÷ 2 = 4 20 ÷ △ = 4 □ ÷ △ = 4  **Scaling**  Sam ran 6km on Saturday. On Sunday he ran half as far. How far did he run on Sunday? |