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| **Multiplication** | | |
| **Foundation Stage 2 Objectives:**   * 40 – 60 months - Finds the total number of items in two groups by counting all of them. * In practical activities and discussions begins to use the vocabulary involved in multiplication * Early Learning Goal - They solve problems, including doubling, halving and sharing. | | |
| Concrete | Pictorial | Abstract |
| Looking at reflections in the mirror  Make prints by folding paper in half | Image result for printing butterfly symmetry ks1 |  |
| Doubling on hands and finding doubles on dominoes etc. |  | Match the dots/colour them in…  Image result for doubles on dominoes |
| **Year 1 Objectives:**   * solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher * Non-statutory guidance: Through grouping small quantities, pupils begin to understand: multiplication and doubling numbers and quantities. * They make connections between arrays, number patterns, and counting in 2s, 5s and 10s. | | |
| Concrete | Pictorial | + |
| Start with doubling using concrete resources | Use diagrams to show doubling. | 2+2=4 |
| Count in 2s, 5s and 10s using resources to support | Count in 2s, 5s and 10s on your hands and recognise the patterns on number lines. | 2,4, 6 etc. |
| Introduce repeated addition for multiplication. Use resources to show the amount in each group. Progress on to representing this as an array. Use contextual links to problem solve. | Solve multiplication problems through repeated addition, using pictures, diagrams and own drawings to support understanding.    C:\Users\kbevan\AppData\Local\Packages\Microsoft.MicrosoftEdge_8wekyb3d8bbwe\TempState\Downloads\Image-46.png      Starting to use arrays and looking for patterns when counting in multiples. | **5+5+5 = 15** |
| **Year 2 Objectives:**  Pupils should be taught to:   * Count in steps of 2, 3, 5 and 10. * recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers * calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs * show that multiplication of 2 numbers can be done in any order (commutative) * solve problems involving multiplication, using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts | | |
| Concrete | Pictorial | Abstract |
| Count in 2s, 5s and 10s using resources to support | Count in 2s, 5s and 10s on your hands and recognise the patterns on number lines. | 2,4, 6 etc. |
| Introduce repeated addition for multiplication. Use resources to show the amount in each group. Progress on to representing this as an array. Use contextual links to problem solve. | C:\Users\kbevan\AppData\Local\Packages\Microsoft.MicrosoftEdge_8wekyb3d8bbwe\TempState\Downloads\Image-47.png  Show repeated addition as jumps on a number line.    Solve multiplication problems through repeated addition, using pictures, diagrams and own drawings to support understanding when **grouping.**   |  |  |  | | --- | --- | --- | | 5 | 5 | 5 | |  |  |  | | **5+5+5 = 15**  **3 x 5 = 15**  **5 x 3 = 15**  **(commutativity)**  **Relate to division facts (once division has been taught):**  **15÷3= 5**  **15÷5= 3**  **Variation Ideas:**  2 x 3  2 x 30  2 x 300  20 x 3  200 x 3 |
| **Year 3 Objectives:**  Pupils should be taught to:   * recall and use multiplication facts for the 3, 4 and 8 multiplication tables * write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods * solve problems, including missing number problems, involving multiplication, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects | | |
| Concrete | Pictorial | Abstract |
| Build on use on arrays to show the commutative law. | 5 x 3 = 15    3 x 5 = 15 | 5x3=15  3x5=15  **Relate to division facts:**  **15÷3= 5**  **15÷5= 3** |
| C:\Users\kbevan\AppData\Local\Packages\Microsoft.MicrosoftEdge_8wekyb3d8bbwe\TempState\Downloads\20190403_142737.jpg | C:\Users\kbevan\AppData\Local\Packages\Microsoft.MicrosoftEdge_8wekyb3d8bbwe\TempState\Downloads\20190403_143400.jpg | |  |  |  |  | | --- | --- | --- | --- | | **x** | **40** | **2** | **=** | | **3** | 120 | 6 | 126 |   3 x 42 = 126  3 x 40 = 120  3 x 2 = 6  120 + 6 = 126 |
| Doubling  C:\Users\kbevan\AppData\Local\Packages\Microsoft.MicrosoftEdge_8wekyb3d8bbwe\TempState\Downloads\20190403_145817.jpg | Doubling  C:\Users\kbevan\AppData\Local\Packages\Microsoft.MicrosoftEdge_8wekyb3d8bbwe\TempState\Downloads\20190403_144925.jpg | Doubling  48 x 2 = 96  48  (40 x 2) +  80 +  (8 x 2)  16 = 96 |
| **Year 4 Objectives:**  Pupils should be taught to:   * recall multiplication facts for multiplication tables up to 12 × 12 * use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 1; multiplying together 3 numbers * recognise and use factor pairs and commutativity in mental calculations * multiply two-digit and three-digit numbers by a one-digit number using formal written layout * solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects | | |
| Concrete | Pictorial | Abstract |
| See above for arrays to demonstrate commutativity. |  |  |
| Using partitioning of a factor to support mental approaches with multiplication | 8 x 6  5 x 6 3 x 6  Discussion point:  Which other ways could you partition the factors?  e.g. 4 x 6 and 4 x 6 8 x 3 and 8 x 3 8 x 5 and 8 x 1  Could also been shown with a numberline | 8 x 6 =  5 x 6 = 30  3 x 6 = 18  30 + 18 = 48 |
| 5 x 34 = | |  |  |  |  |  | | --- | --- | --- | --- | --- | | 34 | 34 | 34 | 34 | 34 |     5 x 34 =  5 x 30 = 150 because 5 x 3 = 15  5 x 4 = 20  150 + 20 = 170 | |  |  |  |  | | --- | --- | --- | --- | | **x** | **30** | **4** | **=** | | **5** | 150 | 20 | 170 |   150 + 20 = 170  34 x 5 =  5 x 30 = 150  5 x 4 = 20  150 + 20 = 170   |  |  |  | | --- | --- | --- | |  | 3 | 4 | | x |  | 5 | |  | 2 | 0 | | 1 | 5 | 0 | | 1 | 7 | 0 | |  |  |  |   This may lead to a compact method.   |  |  |  | | --- | --- | --- | |  | 3 | 4 | | x | 2 | 5 | | 1 | 7 | 0 | |  |  |  | |
| Progress onto 3 digit multiplied by a 1 digit number using the same strategies as above. |  | Demonstrate 3 x 1 digit before using compact method.  274 x 8 =  8 x 200 = 1600  8 x 70 = 560  8 x 4 = 32  1600 + 560 + 32 = 2192 |
| **Year 5 Objectives:**  Pupils should be taught to:   * multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers * multiply numbers mentally, drawing upon known facts * multiply whole numbers and those involving decimals by 10, 100 and 1,000 | | |
| Concrete | Pictorial | Abstract |
| Children can continue to be supported by place value counters at this stage of multiplication. This initially done where there is no regrouping. 321 x 2 = 642 |  | Secure compact multiplication with 3 x 1 digit and 4 x 1 digit.     |  |  |  |  | | --- | --- | --- | --- | |  | 3 | 2 | 7 | | x |  |  | 4 | |  |  | 2 | 8 | |  |  | 8 | 0 | | 1 | 2 | 0 | 0 | | 1 | 3 | 0 | 8 |   Leading to a compact method:   |  |  |  |  | | --- | --- | --- | --- | |  | 3 | 2 | 7 | | x |  |  | 4 | |  | 1 | 2 |  | | 1 | 3 | 0 | 8 | |
| Multiplying 2 x 2 digit using the expanded method.  Extending onto compact multiplication before moving onto 3 and 4 digit numbers x 2 digit.  Progress onto calculations with missing numbers. | Demonstrate using the grid method 2 x 2 digit before moving to a more formal method to secure understanding.   |  |  |  |  | | --- | --- | --- | --- | | x | 30 | 6 |  | | 20 | 600 | 120 | = 720 | | 4 | 120 | 24 | = 144 |   720 + 144 = 864 | |  |  |  |  | | --- | --- | --- | --- | |  | 3 | 6 |  | | x | 2 | 4 |  | |  | 2 | 4 | (4 x 6) | | 1 | 2 | 0 | (4 x 30) | | 1 | 2 | 0 | (20 x 6) | | 6 | 0 | 0 | (20 x30) | | 8 | 6 | 4 |  | |  |  |  |  |   Leading to:   |  |  |  | | --- | --- | --- | |  | 3 | 6 | | x | 2  2 | 4 | | 1  1 | 4 | 4 | | 7 | 2 | 0 | | 8 | 6 | 4 | |
| **Year 6 Objectives:**  Pupils should be taught to:   * multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication * perform mental calculations, including with mixed operations and large numbers | | |
| **Concrete** | **Pictorial** | **Abstract** |
| As year 5 but progressing onto using decimals TO.t x O as an expanded calculation.  (tens, ones and tenths x ones)  If pupils are secure, they may prgress onto the compact method. |  | Expanded   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | T | O | . | t | |  | 2 | 3 | . | 3 | | x |  | 7 |  |  | |  |  | 2 | . | 1 | |  | 2 | 1 | . | 0 | | 1 | 4 | 0 | . | 0 | | 1 | 6 | 3 | . | 1 |   Compact   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | T | O | . | t | |  | 2 | 3 | . | 3 | | x |  | 7 |  |  | |  | 2 | 2 |  |  | | 1 | 6 | 3 | . | 1 | |