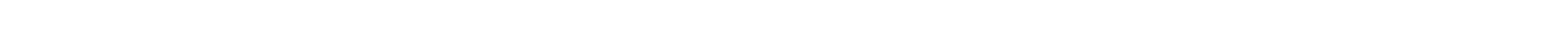
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**Calculation Policy**

Adapted from the White Rose Calculation Policy

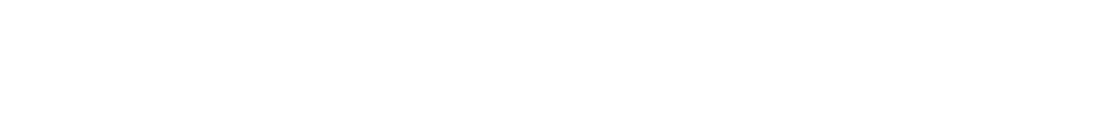
Mrs. J.M. Jobling September 2021



Key language:

sum, total, parts and wholes, plus, add, altogether, more,

‘is equal to’ ‘is the same as’.



Calculation policy: A

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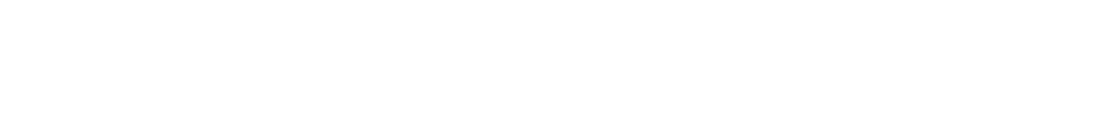
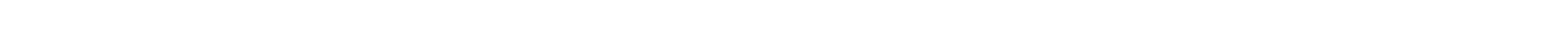
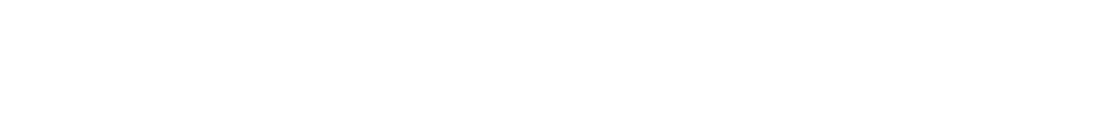
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| Concrete | Pictorial | Abstract |
| Combining two parts to make a whole (use other resources too e.g. eggs, shells, teddy bears, cars). | Children to represent the cubes using dots or crosses. They could put each part on a part whole model too. | 4 + 3 = 7  Four is a part, 3 is a part and the whole is seven. |
| Counting on using number lines using cubes or Numicon. | A bar model which encourages the children to count on, rather than count all. | The abstract number line:  What is 2 more than 4?  What is the sum of 2 and 4?  What is the total of 4 and 2?  4 + 2 |

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| Regrouping to make 10; using ten frames and counters/cubes or using Numicon.  6 + 5 | Children to draw the ten frame and counters/cubes. | Children to develop an understanding of equality e.g.  6 + □ = 11  6 + 5 = 5 + □  6 + 5 = □ + 4 |
| TO + O using base 10. Continue to develop understanding of partitioning and place value.  41 + 8 | Children to represent the base 10 e.g. lines for tens and dot/crosses for ones. | 41 + 8  1  + 8 = 9  40  + 9 =  49 |
| TO + TO using base 10. Continue to develop understanding of partitioning and place value.  36 + 25 | Chidlren to represent the base 10 in a place value chart. | Looking for ways to make 10.  30 + 20 = 50  5 + 5 = 10  50 + 10 + 1 = 61  36  Formal method: +125  61 |

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| Use of place value counters to add HTO + TO, HTO + HTO etc. When there are 10 ones in the 1s column- we exchange for 1 ten, when there are 10 tens in the 10s column- we exchange for 1 hundred. | | Chidren to represent the counters in a place value chart, circling when they make an exchange. | | 2 43  +13168  6 11 |
| Conceptual variation; different ways to ask children to solve 21 + 34 | | | | |
| 21    34    ? | Word problems:  In year 3, there are 21 children and in year 4, there are 34 children. How many children in total?  21 + 34 = 55. Prove it | | 21 + 34 =  = 21 + 34  Calculate the sum of twenty-one and thirty-four. | Missing digit problems: |

# Calculation policy: subtractionCalculation policy: Subtraction

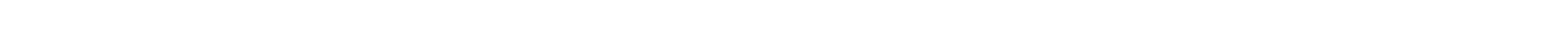
Key language: take away, less than, the difference, subtract, minus, fewer, decrease.



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| Concrete | Pictorial | Abstract |
| Physically taking away and removing objects from a whole (ten frames, Numicon, cubes and other items such as beanbags could be used).  4 – 3 = 1 | Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used. | 4  -    3  =    =  4  –    3 |
| Counting back (using number lines or number tracks) children start with 6 and count back 2.  6 – 2 = 4 | Children to represent what they see pictorially e.g. | Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line |

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| Finding the difference (using cubes, Numicon or Cuisenaire rods, other objects can also be used).  Calculate the difference between 8 and 5. | Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate. | Find the difference between 8 and 5.   1. – 5, the difference is   Children to explore why   1. - 6 = 8 – 5 = 7 – 4 have the same difference. |
| Making 10 using ten frames. 14 – 5 | Children to present the ten frame pictorially and discuss what they did to make 10. | Children to show how they can make 10 by partitioning the subtrahend.    14 – 4 = 10  10 – 1 = 9 |
| Column method using base 10. 48-7 | Children to represent the base 10 pictorially. | Column method or children could count back 7. |

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| Column method using base 10 and having to exchange. 41 – 26 | | Represent the base 10 pictorially, remembering to show the exchange. | | | | Formal column method. Children must understand that when they have exchanged the 10 they still have 41 because 41 = 30 + 11. |
| Column method using place value counters. 234 – 88 | | Represent the place value counters pictorially; remembering to show what has been exchanged. | | | | Formal colum method. Children must understand what has happened when they have crossed out digits. |
| Conceptual variation; different ways to ask children to solve 391 - 186 | | | | | | |
|  | Raj spent £391, Timmy spent £186. How much more did Raj spend?  Calculate the difference between 391 and 186. | |  |  | = 391 – 186  What is 186 less than 391? | Missing digit calculations |
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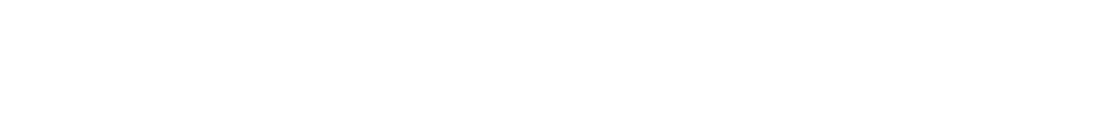
Key language:

double,

times, multiplied by, the product of, groups of, lots of,

equal groups

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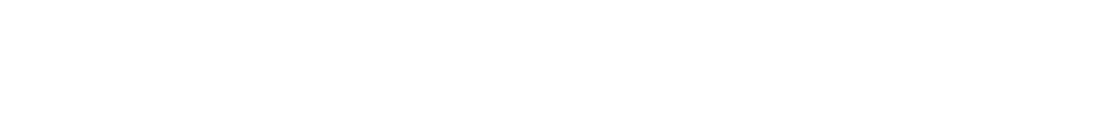
Calculation policy: M

ultiplication

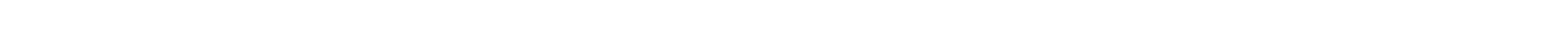
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| Concrete | Pictorial | Abstract |
| Repeated grouping/repeated addition   1. × 4 2. + 4 + 4   There are 3 equal groups, with 4 in each group. | Children to represent the practical resources in a picture and use a bar model. | 1. × 4 = 12 2. + 4 + 4 = 12 |
| Number lines to show repeated groups-  3 × 4  Cuisenaire rods can be used too. | Represent this pictorially alongside a number line e.g.: | Abstract number line showing three jumps of four.  3 × 4 = 12 |

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| Use arrays to illustrate commutativity counters and other objects can also be used. 2 × 5 = 5 × 2 | Children to represent the arrays pictorially. | Children to be able to use an array to write a range of calculations e.g.  10 = 2 × 5  5 × 2 = 10  2 + 2 + 2 + 2 + 2 = 10  10 = 5 + 5 |
| Partition to multiply using Numicon, base 10 or Cuisenaire rods. 4 × 15 | Children to represent the concrete manipulatives pictorially. | Children to be encouraged to show the steps they have taken.  A number line can also be used |
| Formal column method with place value counters (base 10 can also be used.) 3 × 23 | Children to represent the counters pictorially. | Children to record what it is they are doing to show understanding. 3 × 23 3 × 20 = 60  3 × 3 = 9    20  3  60 + 9 = 69 |

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| Formal column method with place value counters. 6 x 23 | | Children to represent the counters/base 10, pictorially e.g. the image below. | | Formal written method  6 x 23 =  23  x  1  6  138 |
| When children start to multiply 3d × 3d and 4d × 2d etc., they should be confident with the abstract:  To get 744 children have solved 6 × 124.  To get 2480 they have solved 20 × 124. | | | | 124 x 1 226 744 +  121480  3 224 |
| Conceptual variation; different ways to ask children to solve 6 × 23 | | | | |
|  | Mai had to swim 23 lengths, 6 times a week.  How many lengths did she swim in one week?  With the counters, prove that 6 x 23 = 138 | | Find the product of 6 and 23  6 × 23 =    =  6 ×    23 | What is the calculation? What is the product? |



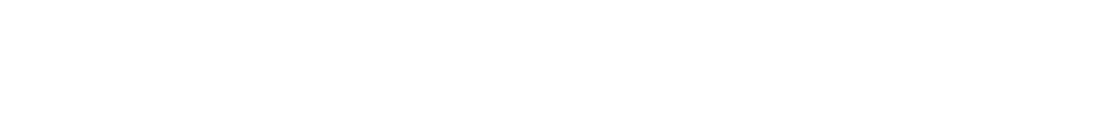
Calculation policy: subtraction



Key language:

share, group, divide, divided by, half

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Calculation policy:

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| Concrete | Pictorial | Abstract |
| Sharing using a range of objects. 6 ÷ 2 | Represent the sharing pictorially. | 6 ÷ 2 = 3    Children should also be encouraged to use their 2 times tables facts. |
| Repeated subtraction using Cuisenaire rods above a ruler. 6 ÷ 2 | Children to represent repeated subtraction pictorially. | Abstract number line to represent the equal groups that have been subtracted. |

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| 2d ÷ 1d with remainders using lollipop sticks. Cuisenaire rods, above a ruler can also be used. 13 ÷ 4  Use of lollipop sticks to form wholes- squares are made because we are dividing by 4.  There are 3 whole squares, with 1 left over. | Children to represent the lollipop sticks pictorially.  There are 3 whole squares, with 1 left over. | 13 ÷ 4 – 3 remainder 1  Children should be encouraged to use their times table facts; they could also represent repeated addition on a number line.  ‘3 groups of 4, with 1 left over’ |
| Sharing using place value counters. 42 ÷ 3 = 14 | Children to represent the place value counters pictorially. | Children to be able to make sense of the place value counters and write calculations to show the process.  42 ÷ 3  42 = 30 + 12  30 ÷ 3 = 10  12 ÷ 3 = 4  10 + 4 = 14 |

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| Short division using place value counters to group.  615 ÷ 5     1. Make 615 with place value counters. 2. How many groups of 5 hundreds can you make with 6 hundred counters? 3. Exchange 1 hundred for 10 tens. 4. How many groups of 5 tens can you make with 11 ten counters? 5. Exchange 1 ten for 10 ones. 6. How many groups of 5 ones can you make with 15 ones? | Represent the place value counters pictorially. | Children to the calculation using the short division scaffold. |
| Long division using place value counters 2544 ÷ 12 | |  |

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| Conceptual variation; different ways to ask children to solve 615 **÷** 5 | | | |
| Using the part whole model below, how can you divide 615 by 5 without using short division? | I have £615 and share it equally between 5 bank accounts. How much will be in each account?  615 pupils need to be put into 5 groups. How many will be in each group? | 615  ÷ 5  =      =  615 ÷  5 | What is the calculation? What is the answer? |