

Parent Guide

Maths calculation guide 2022

This guide supports the White Rose maths scheme used throughout Highburton C.E (vc) First School.

Progression within each area of calculation is in line with the programme of study in the 2014 National Curriculum.

This calculation guide should be used to support children to develop a deep understanding of number and calculation. It has been designed to teach children through the principles of Maths Mastery using, concrete, pictorial and abstract representations.

*Concrete representation—* a pupil is first introduced to an idea or skill by acting it out with real objects. This is a ‘hands on’ component using real objects and is a foundation for conceptual understanding.

*Pictorial representation –* a pupil has sufficiently understood the ‘hands on’ experiences performed and can now relate them to representations, such as a diagram or picture of the problem.

*Abstract representation*—a pupil is now capable of representing problems by using mathematical notation, for example 12 x 2 = 24.

It is important that conceptual understanding, supported by the use of representation, is secure for all procedures. Reinforcement is achieved by going back and forth between these representations.

**Reception**

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| Addition (Reception) | |
| Explore part, part whole relationship - combining two parts to make a whole. |  |
| Using the ten frame/egg boxes to support addition of single digits - counting all/ combining two groups |  |
| Solving problems using concrete, pictorial images. |  |

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| Subtraction (Reception) | |
| Using concrete strategies for counting |  |
| Using the ten frames to support subtraction by taking away |  |
| Solving problems using concrete, pictorial images. | Peter has 5 pencils and 3 erasers. How many more pencils than erasers does he have? |

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|  | Multiplication (Reception) | |
| Experiencing equal groups of objects    They will think about doubling when solving practical problems. |  | |
|  | | Division (Reception) |
| Sharing practical objects.    Hearing and being exposed to language to describe half and seeing visual representations. | |  |

**Year 1**

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| Addition (Year 1) | |
| Combining two parts to make a whole: part whole model. Joining two groups and then recounting all objects (lots of practice making 10 and numbers to 10 e.g.6 + 4 = 10 or 3 + 5 = 8) |  |
| Number Bonds Learn number bonds to 20 and demonstrate related facts. Addition and subtraction taught alongside each other as pupils need to see the  relationship between the facts. |  |
| Add and subtract  one digit  numbers and two-digit numbers to 20, including zero |  |
| Bridging 10; 6 + 6 = 12 Make 9 in one and 3 in the other. Take one from the 3 to make the 9 into a ten….10+2 = 12 use ten frames, Singapore bars, egg boxes and number lines to practice.  Children should start with the larger number and add the smaller number seeing what |  |

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| Subtraction (Year 1) | |
| Taking away should begin with physical objects: counters, cubes,  Dienes etc |  |
| Subtraction by counting back |  |
| Subtracting a single digit  number from a  single digit  number and a single digit from a two digit by crossing out pictures |  |
| Subtracting using the part, part whole model (include problem solving with  missing digits). ? - 5 = 2 |  |
| When subtracting using Dienes children should be taught to regroup (rename) a ten rod for 10 ones and then subtract from those |  |
| Subtracting Multiples of 10.  Using the vocabulary of 1 ten, two tens, etc, alongside 10,  20, 30 is important |  |

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| Multiplication (Year 1) | |
| Counting in Multiples of 2, 5 and 10 from zero.  Children should count the number of groups on their fingers as they are skip counting. |  |
| When moving to pictorial/written calculations the  language is important |  |
| Solving  Multiplication Problems using repeated addition |  |

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|  | Division (Year 1) |
| Pupils should be taught to divide by working practically and the sharing should be shown below the whole to familiarise children with the concept of the whole. |  |

**Year 2**

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| Addition (Year 2) | |
| Using concrete and pictorial representations to add a 2 digit number to a 1 digit number and a 2 digit number to a tens number. |  |
| Using concrete and pictorial representations to add two 2 digit numbers. |  |

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|  | Addition (Year 2) |
| Using concrete and pictorial representations to add 3 single digit numbers. |  |
| Using the bar model to find missing digits:  It is important for the children to use the bar model in this way to encourage the use of it to aid problem solving. |  |

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| Subtraction (Year 2) | |
| Using concrete and pictorial representations to subtract a 1-digit number  from a 2-digit number |  |
| Using concrete and pictorial representations to subtract a 2 digit number from a tens number |  |
| Using concrete and pictorial representations to subtract a 2-digit number  from a 2-digit number |  |
| Recognise and use the inverse relationship between addition and subtraction. |  |

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| Multiplication (Year 2) | |
| Skip counting in multiples of 2, 3, 5 and 10 from zero. |  |
| Recall and reuse multiplication facts for the 2-, 5- and 10-times tables. |  |
| Use multiplication sign (X) and equals sign (=) when writing out multiplication tables. |  |
| Understand that multiplication is commutative  Pupils should understand that an array can represent different  equations and that as multiplication is commutative the order does not affect the answer. |  |

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|  | Multiplication (Year 2) |
| Solve multiplication problems using arrays and repeated addition. |  |

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| Division (Year 2) | |
| Recall and use the division facts for 2, 5 and 10 multiplication tables. |  |
| Solve division problems in context by using concrete objects by sharing. |  |
| Solve division problems in context using arrays. |  |
| Solve division using grouping. |  |

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|  | Division (Year 2) |
| Use the inverse. This should be taught alongside  both multiplication and division. |  |

**Year 3**

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| Addition (Year 3) | |
| Add two three-digit numbers.  Children need to first use equipment to  support understanding of place value. Start without renaming then gradually move onto renaming. |  |
| Bar Modelling  It is important for the children to use the bar model in this way to encourage the use of it to aid problem solving. |  |

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| Subtraction (Year 3) | |
| Subtract up to 3 digits from 3 digits.  Children need to first use equipment to  support understanding of place value.  Only when children are secure with method should exchanging be introduced. |  |
| Bar Modelling  It is important for the children to use the bar model in this way to encourage the use of it to aid problem solving. |  |

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| Multiplication (Year 3) | |
| Children should be able to recall the 2, 5, 10, 3, 4  and 8 multiplication tables.    Multiply a 2-digit number by a 1 digit number. |  |
| Bar Modelling  It is important for the children to use the bar model in this way to encourage the use of it to aid problem solving. |  |

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| Division (Year 3) | |
| Dividing and grouping understanding the concept of remainders. |  |
| Dividing using short division  Once the children are secure with division as grouping and can demonstrate this on number lines, arrays etc. short division should be introduced for dividing larger 2 digit numbers. Initially with carefully chosen calculations requiring no remainders. Compare the layout of short division and that of an array. |  |
| Bar Modelling  It is important for the children to use the bar model in this way to encourage the use of it to aid problem solving. |  |

**Year 4**

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| Addition (Year 4) | |
| Adding numbers with up to 4 digits.  Again, this should start with the children using equipment to support and lots of discussion about the values of digits. |  |
| Using the bar model to find missing digits. |  |

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| Subtraction (Year 4) | |
| Subtract with numbers up to four digits, including exchanging. |  |
| Using the bar model to find missing digits. |  |

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| Multiplication (Year 4) | |
| Children know all times tables up to 12 x 12.  Children use expanded column multiplication |  |
| Multiply using the bar model |  |

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| Division (Year 4) | |
| Dividing 3-digit numbers by a 1 digit number using short division. |  |
| Divide using the bar model |  |

**Year 5**

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| Addition (Year 5) | |
| Adding numbers with more than 4 digits including decimals.    Using place value charts and place value counters is key when understanding adding decimals. |  |
| Using the bar model to find missing digits. |  |

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| Subtraction (Year 5) | |
| Subtract with at least 4-digit numbers including two decimal places.    Include money, measures and decimals. |  |
| Using the bar model to find missing digits. |  |

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| Multiplication (Year 5) | |
| Multiply up to 4-digit numbers by 2-digit numbers using long division.    Children need to be taught to approximate  first to check  the  reasonableness of their answers.    So, 56 x 27 could be 60 x 30 =  1800 |  |
| Using the bar model to support multiplication |  |

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| Division (Year 5) | |
| Divide up to 4-digit numbers by 1-digit numbers using short division. Also, numbers that have remainders. |  |
| Using the bar model to support division |  |

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| Addition (Year 6) | |
| Adding several numbers with up to 3 decimal places. |  |
| Using the bar model to support addition |  |

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| Subtraction (Year 6) | |
| Subtracting with increasingly more complex  numbers including decimals. |  |
| Using the bar model to support subtraction |  |

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| Multiplication (Year 6) | |
| Short and long multiplication with up to 2 decimal places. |  |
| Using the bar model to support multiplication |  |

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| Division (Year 6) | |
| Short division to divide by a 1-digit number. |  |
| Long division to divide by 2-digit number. |  |
| Using the bar model to support division |  |