

| Addition | Concrete | Pictorial | Abstract |
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| Foundation | Use part-part whole model. <br> Use cubes to add two numbers together as a <br> group or in a bar. | Make a record in pictures, words or <br> symbols of addition activities already <br> carried out. |  |
| Use pictures to add two numbers |  |  |  |
| together as a group or in a bar. |  |  |  |$\quad$| Children will engage in a wide variety of |
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| songs, games and activities. |

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| Year 1 | Use part－part whole model． <br> Use cubes to add two numbers together as a group or in a bar． <br> Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer． | Use pictures to add two numbers together as a group or in a bar． $\square$ <br> Initially use a number track to count on for addition，counting on from the largest number： $8+7=15$＇Put your finger on number eight and count on seven．＇ | Children will continue to practice counting on from any number e．g．＇Put five in your head and count on four．＇ <br> Using the part－part whole diagram to move into the abstract <br> 5 |
| :---: | :---: | :---: | :---: |
| Year 2 | Model using dienes，place value counters and numicon $\square$ Regrouping to make 10. $6+5=11$ <br> Start with the bigger number and use the smaller number to make 10. | Counting on in ones and tens using an empty number line，within 100．．． $28+5=33$ $\begin{array}{llllll} 28 & 29 & 30 & 31 & 32 & 33 \end{array}$ $28+30=58$ <br> Also using Bar Model $7+3=10$ | $\begin{gathered} 25+47 \\ 20+5 \\ 20+40=60 \\ 5+7=12 \\ 60+12=72 \end{gathered}$ $23+25=48$ <br> Number line approach may also be modelled to children as another approach to addition． |

Progression in Calculation Policy 2019-2020

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| Year 3 |  <br> Model using Dienes or numicon <br> Add together the ones first, then the tens. <br> Vove to using place value counters | Further develop the use of the empty number line with calculations that bridge 100: $78+46=124$ <br> Introduce column method $\begin{aligned} 63+32= & 95 \\ & \quad 60+3 \\ + & \frac{30+2}{90+5}=95 \end{aligned}$ | $\begin{array}{r} 223 \\ +114 \\ 337 \end{array}$ <br> Add the ones first, then the tens, then the hundreds. |
| Year 4 | Continue to use dienes or Place Value counters for adding, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand. | $\bullet$ $\ddots$ $\because$ $\because$ <br> $\because \bullet$ $\because$ $\bullet$ $\because$ <br>  $\ddots$  $\ddots$ <br> 7 1 5 1 <br> $\bullet$ $\bullet$   <br> Draw representations using pv grid. | Further develop the formal written method of addition, with three-digit numbers. Revisit the expanded method first, if necessary. $\begin{aligned} & 176+147=323 \\ & 176 \\ & +\frac{147}{13}(6+7) \\ & 110(70+40) \\ & 200(100+100) \\ & \hline 323 \\ & \hline \end{aligned}$ |


|  |  |  | This will lead into the formal written method. <br> $1845+526=2371$ <br> 1845 |
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| Year 5 | Use Year 4 method if appropriate | Continue to teach the use of <br> empty number lines with larger <br> numbers (and decimals), as <br> appropriate. |  |


| Subtraction | Concrete | Pictorial | Abstract |
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| Foundation | Use physical objects, counters, cubes etc <br> to show how objects can be taken away. <br> Part-Part whole or bar modelling used with counters <br> Solve simple word problems using their fingers | Children draw representations of the objects. Including part-part whole or bar model. ○○○○婴 <br> $5-1=4$ | Children will engage in a wide variety of songs, games and activities <br> Using quantities and objects children subtract two single digit numbers. <br> Children may be introduced to written 'number sentence' e.g. 7 $3=4$ |

Year 1 Use physical objects, counters, cubes etc

| Year 2 | $34-13=21$ <br> Use Dienes to show how to partition the number when subtracting without regrouping. <br> Finding difference <br> Use a bead bar or bead strings to model counting to next ten and the rest. | Use a number line to count on to next ten and then the rest. <br> Children draw representations of Dienes and cross off. $43-21=22$ | Counting back using an empty number line within 100, in ones... $34-6=28$ <br> And in tens.... <br> If children are confident, use efficient jumps: |
| :---: | :---: | :---: | :---: |
| Year 3 | Begin with dienes or Numicon. Move to PV counters, modelling the exchange of a ten into ten ones. Use the phrase 'take and make' for exchange. | Children to continue to use number line approaches leading to strategy below. | Begin by partitioning into PV columns <br> Then move to a formal method |

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|  |  |  | $\begin{array}{ccc} 7 & 28 & -582=146 \\ { }^{\prime \prime} & 1 & u \\ 77 & 2 & 8 \\ 5 & 8 & 2 \\ \hline 1 & 4 & 6 \\ \hline \end{array}$ |
| :---: | :---: | :---: | :---: |
| Year 4 | 234-179 <br> Model process of exchange using Numicon, base ten and then move to PV counters. | Draw the Base 10 or place value counters alongside the written calculation to help to show working. | Continue to develop the formal written method for subtraction with three and four digit numbers, returning to an expanded method and using base ten materials, if necessary. Move onto larger numbers $\begin{gathered} 3625-1219=2406 \\ 3625 \\ -\quad 1219 \\ \hline 2406 \end{gathered}$ |

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| Year 5-6 | Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount. | Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make. <br> When confident, children can find their own way to record the <br> exchange/regrouping. | Continue to teach the use of empty number lines with larger numbers (and decimals), as appropriate. <br> Continue to develop the formal written method for addition with larger numbers (and decimal numbers) and with the addition of three or more numbers. $£ 154.75+£ 233.82=£ 388.57$ $\begin{array}{r} 154.75 \\ +\quad 233.82 \\ \hline 388.57 \end{array}$ <br> 1 <br> Ensure that the decimal points line up. |
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Progression in Calculation Policy 2019-2020

| Multiplication | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Foundation | Children to use counters and through song, begin to count in a given multiple. <br> Part -part whole used with counters <br> Begin to use resources to count in repeated groups of the same size: count in twos; fives; tens | Children draw visual representations of maths problems involving repeated addition and doubling. | Children shown multiplication number sentence alongside visual representation. <br> Children explore different objects to make doubles- dice, spots on ladybirds. Children shown abstract 'number sentence' alongside visual representation. <br> Children are able to chant in twos, fives and tens |
| Year 1 | In practical activities and through discussion they will begin to solve problems involving doubling. <br> Three apples for me and three apples for you. How many apples altogether? <br> Children arrange counters for them | Use different objects to add | Write addition sentences to describe objects and pictures. <br> Use pictorial including number lines to <br> solve problems <br> I have 2 toys in a box. How many toys |

Progression in Calculation Policy 2019-2020

|  | to use to count in multiples. | equal groups | would I have if I had 5 boxes altogether? |
| :---: | :---: | :---: | :---: |
| Year 2 | Create arrays using counters and cubes and <br> Numicon. <br> Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer. | Use representations of arrays to show different calculations and explore commutatively. <br> $4 \times 3$ or $3 \times 4$ <br> Using Bar model approach to show missing number problems. $4 \times \square=20$ | $\begin{aligned} & 12=3 \times 4 \\ & 12=4 \times 3 \end{aligned}$ <br> Use an array to write multiplication sentences as well as a number line to reinforce repeated addition $\begin{aligned} & 5+5+5=15 \\ & 3+3+3+3+3=15 \\ & 5 \times 3=15 \\ & 3 \times 5=15 \end{aligned}$ |

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| Year 3 | Show the link with arrays to first introduce the grid method. <br> 4 row $s$ of 10 <br> 4 rows of 3 <br> Move on to using Base 10 to move towards a more compact method. <br> 4 rows of 13 <br> Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows. | Children can represent their work with place value counters. E.g. Counters using colours to show different amounts or just use the circles in the different columns to show their thinking as shown below. <br> The grid method may be used to show how this relates to a formal written method. <br> Bar Modelling to support children with problem solving. | Start with multiplying by one digit numbers and showing the clear addition alongside the grid. <br> 327 |

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|  | Fill each row with 126. <br> Add up each column, starting with the ones making any exchanges needed. <br> Then you have your <br> answer. |  $\begin{aligned} & 8=59 \\ & =8 \times 60-8 \\ & 8 \times 6=48 \\ & 8=60=4,80 \\ & 4,80-8=472 \end{aligned}$ |  |
| :---: | :---: | :---: | :---: |
| Year 4-6 | Children can continue to be supported by place value counters | The grid method may be used to show how this relates to a formal written method. <br> Continue to use bar modelling to support understanding. | Start with multiplying by one digit numbers and showing the clear addition alongside the grid. |



Progression in Calculation Policy 2019-2020

| Division | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Year <br> 1/EYFS | Children will share objects into equal groups and through discussion they will begin to solve problems involving halving and sharing. <br> I have 10 cubes, can you share them equally into 2 groups? Children use counters with partpart whole model. | Children to use pictures to support their sharing of quantities. <br> 12 shared between 3 is 4 <br> Children find $\frac{1}{2}$ using counters and can also show this by drawing their own representations. | 12 shared between 3 is 4 . <br> Also introduce division sign $12 \div 3=4$ <br> Foundation to be shown number sentence alongside pictorial and concrete support. |
| Year 2 | Use counters, cubes or place value counters to aide understanding. | Use bar modelling or number lines to support $\dagger$ understanding. | $28 \div 7=4$ <br> Divide 28 into 7 groups. How many |


|  |  | Think of number out how many would be within each group. | $2 \div 3=$ <br> the bar groups | a whole ou are di <br> $20 \div$ $5 \times$ | $\begin{aligned} & 5=? \\ & =20 \end{aligned}$ | the nd work $\square$ | groups are there? |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Year 3 | Use cubes, counters or place value counters to aid understanding. | Continue to use bar modelling or number lines to support understanding.$20$ |  |  |  |  | Introduce the formal layout. $\begin{gathered} 24 \div 3=8 \\ 8 \\ 3 \longdiv { 2 4 } \end{gathered}$ |

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Year 4-6

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- Pictorial Concrete


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