## Progression in Calculations

## Addition

| Objective and Strategies | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| EYFS <br> Count reliably with numbers from 1 to 20 Place them in order and say which number is one more | Counting a range of familiar objects ensuring development of 1:1 correspondence. | Start by counting familiar things using blocks or cutout pictures they can physically line up in a row. For instance counting pieces of fruit, or people in the room. With one block or cut-out picture for each orange or person. Using this add 1 more. | $\begin{aligned} & 5+1=6 \\ & 6+1=7 \end{aligned}$ <br> Use pictures of objects to add 1 more - finding how many altogether to use alongside the abstract. |
| EYFS <br> Using quantities and objects, add two singledigit numbers and count on to find the answer. | $\begin{array}{ll} \because=8 & \ddots \\ 2,3,4,5,6,7,8 & \ddots, 7,8 \end{array}$ | Add objects to the row to understand adding by counting on. <br> Counting on using a number track or number line. | $\begin{aligned} & 6+3=9 \\ & 7+4=11 \end{aligned}$ |


| Year 1 <br> Combining two parts to make a whole: partwhole model | Use cubes to add two numbers together as a group or in a bar. |  | $\begin{aligned} & 4+3=7 \\ & 10=6+4 \\ & \begin{array}{l} \text { Use the part-part } \\ \text { whole diagram as } \\ \text { shown above to move } \\ \text { into the abstract. } \end{array} \\ & \hline 16+4=20 \end{aligned}$ |
| :---: | :---: | :---: | :---: |
| Year 1 <br> Starting at the bigger number and counting on | Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer. | $12+5=17$ <br> Start at the larger number on the number line and count on in ones or in one jump to find the answer. | $5+12=17$ <br> Place the larger number in your head and count on the smaller number to find your answer |
| Year 1 <br> Regrouping to make 10. | $6+5=11$ <br> Start with the bigger number and use the smaller number to make 10. | Use pictures or a number line. Regroup or partition the smaller number to make 10 . $9+5=14$ <br> 14 | $7+4=11$ <br> If I am at seven, how many more do I need to make 10 ? How many more do I add on now? |



| order |  |  |  |
| :---: | :---: | :---: | :---: |
| Year 2 <br> Addition facts to 20 <br> Use related <br> facts to 100 | Numicon - addition facts to 20 <br> Tens frames and double sided counters | Draw pictures or use of a number line or similar. | Children's Recordings drawing upon related facts $\begin{aligned} & 6+4=10 \\ & 60+40=100 \\ & 16+4=20 \end{aligned}$ |
| Year 2/3 <br> Column methodno regrouping <br> Year 3-3 digit numbers | $24+15=$ <br> Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters. | After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions. | Calculations $\begin{array}{r} 21+42= \\ 21 \\ +42 \end{array}$ |




## Subtraction

| Objective and Strategies | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| EYFS <br> Count reliably with numbers from 1 to 20, place them in order and say which number is one less than a given number. | How many <br> teddies would there be if we had 1 less? | There are 9 children in a group. One child leaves. How many are in the group now? | $\begin{aligned} & 5-1=4 \\ & 7-1=6 \end{aligned}$ <br> Use pictures of objects to find 1 less - finding how many are left to use alongside the abstract. |
| EYFS <br> Using quantities and objects subtract two single-digit numbers and count back to find the answer. | Can you take away 2 jewels? How many are left? |  | $\begin{aligned} & 6-3=3 \\ & 9-4=5 \end{aligned}$ |

\begin{tabular}{|c|c|c|c|}
\hline \&  \&  \& \\
\hline \begin{tabular}{l}
Year 1 \\
Taking away ones
\end{tabular} \& Use physical objects, counters, cubes etc to show how objects can be taken away.

$6-2=4$ \& Cross out drawn objects to show what has been taken away.

$$
15-3=12
$$ \& \[

$$
\begin{aligned}
& 18-3=15 \\
& 13-8=5
\end{aligned}
$$
\] <br>

\hline | Year 1 |
| :--- |
| Counting back | \& | Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones. |
| :--- |
| Use |
| counters and move them away from the group as you take them away counting backwards as you go. | \& | Count back on a number line or number track |
| :--- |
| Start at the bigger number and count back the smaller number showing the jumps on the number line. |
| Year1/2 |
| This can progress all the way to counting back using two 2 digit numbers. | \& Put 13 in your head, count back 4. What number are you at? Use your fingers to help. <br>

\hline
\end{tabular}

| Year 1 <br> Find the difference | Compare amounts and objects to find the difference. <br> Use cubes to build towers or make bars to find the difference <br> Use basic bar models with items to find the difference <br> Year 1 | Count on to find the difference. <br> Comparison Bar Models <br> Draw bars to find the difference between 2 numbers. <br> Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them. <br> Year 2 | Hannah has 23 sandwiches, Helen has 15 sandwiches. Find the difference between the number of sandwiches. |
| :---: | :---: | :---: | :---: |
| Year 1 <br> Part Part <br> Whole Model | Link to addition- use the part whole model to help explain the inverse between addition and subtraction. <br> If 10 is the whole and 6 is one of the parts. What is the other part? $10-6=$ | Use a pictorial representation of objects to show the part part whole model. | 5 <br> 10 <br> Move to using numbers within the part whole model. <br> Up to 20 |


| Year 1 <br> Make 10 | Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9 . | Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer. <br> Year 2 | $16-8=$ <br> How many do we take off to reach the next 10 ? <br> How many do we have left to take off? |
| :---: | :---: | :---: | :---: |
| Year 2 <br> Sub 2 digit take away ones 2 digit take away 10 s 2 digit take away 2 digit <br> Subtraction not in any order | $56-3=53$ $56-20=36$ <br> pererer $56-23=33$ <br> Explore subtraction in any order - can we calculate 23-56? <br> Compare to addition in any order. | Using a calculations mat to ensure equipment is organised and placed in correct column. <br> Drawing blank number line. | Children's recording Identifying the tens and ones within the calculation. Crossing off the appropriate number. |



method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.

## Multiplication

| Objective and Strategies | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| EYFS <br> Solve problems including doubling |  | Dice doubles <br> Draw dots onto the ladybird to show the same amount on each side. How many in total? | $\begin{aligned} & 5+5=10 \\ & 3+3=6 \end{aligned}$ |
| Year 1 <br> Doubling | Use practical activities to show how to double a number. | Draw pictures to show how to double a number. <br> Double 4 is 8 | Partition a number and then double each part before recombining it back together. <br> Year 2 |


| Counting in multiples <br> Year 1 2s 5s 10s <br> Year 2 <br> $2 s 3 s 5 s 10 s$ | Count in multiples supported by concrete objects in equal groups. |  <br> Use a number line or pictures to continue support in counting in multiples. | Count in multiples of a number aloud. <br> Write sequences with multiples of numbers. <br> $2,4,6,8,10$ <br> $5,10,15,20,25,30$ <br> Year 2 |
| :---: | :---: | :---: | :---: |
| Year 1 <br> Arrays with support | (9) (-1 $\frac{1}{2}$ (T) Counting <br> Make connections between arrays, number patterns and counting in twos, fives and tens. <br> EVERYDAY ARRAYS <br> Explore real life arrays | Using concrete objects, pictorial representations and arrays with the support of an adult - take photographs/draw pictures four lots of two makes eight two lots of four makes eight | Write number sentences (with support) to show what the array represents $\begin{aligned} & 2+2+2+2+2=10 \\ & 5+5=10 \\ & 5 \times 2=10 \\ & 2 \times 5=10 \end{aligned}$ |


| Year 1/2 <br> Repeated addition | $3+3+3$ | There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there? <br> 2 add 2 add 2 equals 6 $5+5+5=15$ | Write addition sentences to describe objects and pictures. |
| :---: | :---: | :---: | :---: |
| Year 2 <br> Arrays- showing commutative multiplication | Create arrays using counters/ cubes to show multiplication sentences. | Draw arrays in different rotations to find commutative multiplication sentences. <br> Link arrays to area of rectangles. | Use an array to write multiplication sentences and reinforce repeated addition. $\begin{aligned} & 5+5+5=15 \\ & 3+3+3+3+3=15 \\ & 5 \times 3=15 \\ & 3 \times 5=15 \end{aligned}$ |
| Year 3 <br> Grid Method <br> Multiplication and division | Show the link with arrays to first introduce the grid method. <br> 4 rows of 10 4 rows of 3 <br> Move on to using Base 10 to move | Children can represent the work they have done with place value counters in a way that they understand. | Start with multiplying by one digit numbers and showing the clear addition alongside the grid. |





## Division

| Objective and Strategies | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| EYFS <br> Solve problems including halving and sharing. |  | There are eight sweets and four boys. How many sweets does each boy get? | Can you share the 8 sweets so that we have half each? |
| Year 1 <br> Sharing objects into groups | I have 10 cubes, can you share them equally in 2 groups? | Children use pictures or shapes to share quantities. $8 \div 2=4$ | Share 9 buns between three people. $9 \div 3=3$ <br> Year 2 |


| Year 1/2 <br> Division as grouping | Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding. $96 \div 3=32$ | Use a number line to show jumps in groups. The number of jumps equals the number of groups. <br> Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group. <br> Year 2 $\begin{aligned} & 20 \div 5=? \\ & 5 \times ?=20 \end{aligned}$ | $28 \div 7=4$ <br> Divide 28 into 7 groups. How many are in each group? |
| :---: | :---: | :---: | :---: |
| Year 2 <br> Division within arrays | Link division to <br> multiplicatio $n$ by creating an array and thinking about the number sentences that can be created. $\begin{array}{rr} \text { Eg } 15 \div 3=5 & 5 \times 3=15 \\ 15 \div 5=3 & 3 \times 5=15 \\ \hline \end{array}$ | Draw an array and use lines to split the array into groups to make multiplication and division sentences. | Find the inverse of multiplication and division sentences by creating four linking number sentences. $\begin{aligned} & 7 \times 4=28 \\ & 4 \times 7=28 \\ & 28 \div 7=4 \\ & 28 \div 4=7 \end{aligned}$ |


| Year 3 <br> Division with a remainder | $14 \div 3=$ <br> Divide objects between groups and see how much is left over. | Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder. <br> Draw dots and group them to divide an amount and clearly show a remainder. <br> (8) © © © © | Complete written divisions and show the remainder using $r$. |
| :---: | :---: | :---: | :---: |
| Year 3 and 4 <br> Short division <br> Year 5 |  | Pupils can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups. | Begin with divisions that divide equally with no remainder. |
|  | Use place value counters to divide using the bus stop method alongside <br> Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over. | Encourage them to move towards counting in multiples to divide more efficiently. | Move onto divisions with a remainder. |


|  |    <br>  10  <br>  10  <br>  10  <br> We exchange this ten for ten ones and then share the ones equally among the groups. <br> We look how much in 1 group so the answer is 14 . |  | Finally move into decimal places to divide the total accurately. |
| :---: | :---: | :---: | :---: |
| Year 6 <br> Long division | $2544 \div 12$ <br> How many groups of 12 thousands do we have? None <br> Exchange 2 thousand for 20 hundreds. <br> How many groups of 12 are in 25 hundreds? 2 groups. Circle them. We have grouped 24 hundreds so can take them off and we are left with | Instead of using physical counters, students can draw the counters and circle the groups on a whiteboard or in their books. <br> Use this method to explain what is happening and as soon as they have understood what move on to the abstract method as this can be a time consuming process. |  |



