

## St Gregory's Catholic Academy

This policy has been largely adapted from the White Rose Maths Hub Calculation Policy with further material added. It is a working document and will be revised and amended as necessary.

## EYFS - Addition 든

| Objective | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Understand the 'one more than' relationship between consecutive numbers. | Use counters, cubes, five/tens frames, fingers etc. to explore adding one more. $=1+A=1=$ |  | One more than 3 is 4 . $5+1=6$ |
| Explore the composition of numbers to 10. | Use physical objects (as above) to combine two groups within 10. |  | $5+2=7$ $5+5=10$ |


| Automatically recall |
| :--- | :--- | :--- | :--- | :--- | :--- |
| number bonds for |
| numbers $0-5$ and begin |
| to recall facts to 10. |

## Year 1 - Addition گ

| Objective \& Strategy | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Combining two parts to make a whole: part-whole model | Use part part whole model. Use cubes to add two numbers together as a group or in a bar. |  | $4+3=7$ <br> 5 <br> 8 <br> 3 $10=6+4$ <br> Use the part-part whole diagram as shown above to move into the abstract. |
| 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. |
| Regrouping to make 10. <br> This is an essential skill for column addition later. |  | $3+9=$ <br> Use pictures or a number line. Regroup or partition the smaller number using the part part whole model to make 10. | $7+4=11$ <br> If I am at seven, how many more do I need to make 10 ? How many more do I add on now? |


|  |  | $9+5=14$ <br> 14 |  |
| :---: | :---: | :---: | :---: |
| Represent \& use number bonds and related subtraction facts within 20 | 2 more than 5 . |  | Emphasis should be on the language <br> ' 1 more than 5 is equal to 6 .' <br> '2 more than 5 is 7 .' <br> ' 8 is 3 more than 5.' <br> Emphasis should be on the language <br> ' 1 more than 5 is equal to 6 .' <br> ' 2 more than 5 is 7 .' <br> ' 8 is 3 more than 5.' |

## Y2 Addition



| Add two 2-digit numbers | Model using dienes, place value counters and numicon |  <br> Use number line and bridge ten using part whole if necessary. | $\begin{aligned} & 20+47 \\ & 20+40=60 \\ & 5+7=12 \\ & 60+12=72 \end{aligned}$ |
| :---: | :---: | :---: | :---: |
| Add three 1-digit numbers | Combine to make 10 first if possible, or bridge 10 then add third digit | Regroup and draw representation. | $\begin{aligned} \frac{4+7+6}{10} & =10+7 \\ & =17 \end{aligned}$ <br> Combine the two numbers that make/bridge ten then add on the third. |

Year 3 - Addition 乌



## Year 4-6 - Addition گ



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| Y5-add numbers with more than 4 digits. Add decimals with 2 decimal places, including money. | As year 4 <br> Introduce decimal place value counters and model exchange for addition. |  |  |  | $\begin{array}{rr} 72.8 & \\ +54.6 & \\ \hline 127.4 & \\ 3 \cdot & 59 \\ \hline+ & 7 \cdot \\ \hline £ 3 & 5 \\ \hline £ & 1 \\ \hline \end{array}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Y6-add several numbers of increasing complexity Including adding money, measures and decimals Extend to numbers with different decimal places. | As Y5 |  |  | As Y5 | $\begin{array}{r} 81,059 \\ 3,668 \\ 15,301 \\ +20,551 \\ \hline 20,579 \\ 111 \\ 23 \cdot 361 \\ 99 \cdot 080 \\ 59 \cdot 770 \\ +\begin{array}{l} 1 \cdot 300 \\ 93 \cdot 511 \\ 21 \end{array} \end{array}$ | Insert zeros for place holders. |

## EYFS Subtraction

| Objective | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Understand the 'one less than' relationship between consecutive numbers. | Use cubes, counters, fingers etc. to explore taking one away to make one less. $5-1=$ | $00 \gg$ | One less than 4 is 3. $\begin{aligned} & 5-1=4 \\ & 10-5=5 \end{aligned}$ |
| Build on one less to take away an amount, developing an understanding of numbers within 10. | Build on above to take away amounts within 10. | (0) |  |
| Automatically recall number bonds for numbers 0-5 (including subtraction) and begin to recall facts to 10 . | Begin with concrete resources as above, but progress to abstract for 'automatic' recall. | $10-3=7$ | I know there is 1 left because I had 4 and took away 3. |

## Y1 Subtraction

| Objective \& Strategy | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Taking away ones. | Use physical objects, counters, cubes etc to show how objects can be taken away. | $15-3=12$ <br> Cross out drawn objects to show what has been taken away. | $\begin{aligned} & 7-4=3 \\ & 16-9=7 \end{aligned}$ |
| Counting back | Move objects away from the group, counting backwards. $\square$ Move the beads along the bead string as you count backwards. | Count back in ones using a number line. | Put 13 in your head, count back 4. What number are you at? |
| Find the Difference | Compare objects and amounts <br> Lay objects to represent bar model. | Count on using a number line to find the difference. | Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister.? |

## Year 1 Subtraction

| Objective \& Strategy | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Represent and use number bonds and related subtraction facts within 20 <br> Part Part Whole model | Link to addition. Use PPW model to model the inverse. <br> If 10 is the whole and 6 is one of the arts, what $s$ the other part? $10-6=4$ | Use pictorial representations to show the part. | Move to using numbers within the part whole model. |
| Make 10 | 14-9 <br> Make 14 on the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5 . | 13-7 $13-7=$ $\square$ <br> Jump back 3 first, then another 4. Use ten as the stopping point. | $16-8$ <br> How many do we take off first to get to 10 ? How many left to take off? |
| Bar model | $5-2=3$ |  | 8 2$\begin{aligned} & 10=8+2 \\ & 10=2+8 \\ & 10-2=8 \\ & 10-8=2 \end{aligned}$ |

## Year 2 Subtraction

| Objective \& Strategy | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Regroup a ten into ten ones | Use a Place value chart to show how to change a ten into ten ones, use the term 'take and make' | $20-4=$ | $20-4=16$ |
| Partitioning to subtract without regrouping. | $34-13=21$ <br> Use Dienes to show how to partition the number when subtracting without regrouping. | Children draw representations of Dienes and cross off. $43-21=22$ | $43-21=22$ |
| Make ten strategy Progression should be crossing one ten, crossing more than one ten, crossing the hundreds. | $34-28=$ <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. | $93-76=17$ |

## Year 3 Subtraction

| Objective \& Strategy | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Column subtraction without regrouping | Use base 10 or Numicon to model |  |  |
| Column subtraction with regrouping | Begin with base 10 or Numicon. Move to place value counters, modelling the exchange of a ten into ten ones. | Children may draw base ten or Place value counters and cross off. | Begin by partitioning into Place value columns <br> Then move to formal method. |
|  |  |  |  |

## Year 4-6 Subtraction

| Objective \& Strategy | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Subtracting tens and ones <br> Year 4 subtract with up to 4 digits. <br> Introduce decimal subtraction through context of money | $234-179$  <br> Model process of exchange using Numicon, base ten and then move to Place value counters. | Children to draw place value counters and show their exchange-see $y_{3}$ | $\begin{array}{r} 2^{6} x^{\prime} 54 \\ -1562 \\ \hline 1192 \end{array}$ <br> Use the phrase 'take and make' for exchange |
| Year 5-Subtract with at least 4 digits, including money and measures. <br> Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal | As Year 4 | Children to draw Place value counters and show their exchange-see y3 | $\begin{array}{r} { }^{2} 8^{\prime \prime} \times 10 \not 86 \\ -\quad 2128 \\ \hline 28,928 \end{array}$ |
| Year 6-Subtract with increasingly large and more complex numbers and decimal values. |  |  | $\begin{array}{r} \quad \not \quad 810,699 \\ -\quad 89,949 \\ \hline 60,750 \\ \hline \begin{array}{r} 185 \cdot 3179 \mathrm{~kg} \\ 36 \cdot 080 \mathrm{~kg} \\ \hline 69 \cdot 339 \mathrm{~kg} \end{array} \\ \hline 69.3 \end{array}$ |

## EYFS Multiplication 5

| Objective | Concrete | Pictorial | Abstract |
| :--- | :--- | :--- | :--- |
| Automatically recall <br> double facts within 10. | Use cubes, counters etc. to explore <br> adding the same number to itself. <br> Progression to abstract for 'automatic' <br> recall. | Double 2 is 4 |  |

Year 1 Multiplication

| Objective \& Strategy | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Doubling | Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling | Draw pictures to show how to double numbers <br> Double 4 is 8 | Partition a number and then double each part before recombining it back together. |
| Counting in multiples | Count the groups as children are skip counting, children may use their fingers as they are skip counting. | Children make representations to show counting in multiples. | Count in multiples of a number aloud. <br> Write sequences with multiples of numbers. $2,4,6,8,10$ |

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|  |  | $100100^{2} 2^{2} 2^{2} 2^{2} 2^{2}{ }^{2} \frac{2}{20010}$ $\begin{array}{lllllllll}2 & 4 & 6 & 8 & 10 & 12 & 14 & 16 & 18 \\ & 20\end{array}$ | $5,10,15,20,25,30$ |
| :---: | :---: | :---: | :---: |
| Making equal groups and counting the total | Use manipulatives to create equal groups. | Draw to show $2 \times 3=6$ <br> Draw and make representations | $2 \times 4=8$ |

## Year 1 Multiplication

|  <br> Strategy | Concrete | Pictorial | Use pictorial including number lines to <br> solve problems | Write addition sentences to describe <br> objects and pictures. |
| :--- | :---: | :---: | :---: | :---: |
| Repeated addition | $3+3+3$ |  |  |  |
| There are 3 sweets in one bag. |  |  |  |  |
| How many sweets are in 5 bags |  |  |  |  |
| altogether? |  |  |  |  |,

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| Understanding arrays | Use objects laid out in arrays to find <br> the answers to 2 lots 5,3 lots of 2 etc. | Draw representations of arrays to show <br> understanding | $3 \times 2=6$ <br> $2 \times 5=10$ |  |
| :--- | :--- | :--- | :--- | :--- |
|  |  |  |  |  |

## Year 2 Multiplication



|  <br> Strategy | Concrete | Pictorial | Abstract <br> Lodel doubling using dienes and Place <br> value counters. |
| :--- | :--- | :--- | :--- |



## Year 2 Multiplication

|  <br> Strategy | Concrete | Pictorial |  |
| :--- | :--- | :--- | :--- | :--- |
| Multiplication is <br> commutative | Create <br> arrays using <br> counters <br> and cubes <br> and <br> Numicon. | Use representations of arrays to show <br> different calculations and explore <br> commutativity. | $12=3 \times 4$ |



## Year 3 Multiplication $\$$



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## Year 4 Multiplication $\$$

| Objective \& Strategy | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Grid method recap from year 3 for 2 digits $\times 1$ digit <br> Move to multiplying 3 digit numbers by 1 digit. (Year 4 expectation) | Use 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 in a way that they understand. <br> They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking as shown below. | Start with multiplying by one digit numbers and showing the clear addition alongside the grid. $210+35=245$ |

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|  |  | $24 \times 3=72$  |  |
| :---: | :---: | :---: | :---: |
| Column multiplication | Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. $321 \times 2=642$ <br> It is important at this stage that they always multiply the ones first. <br> The corresponding long multiplication is modelled alongside | $x$ 300 20 7 <br> 4 1200 80 28 <br> The grid method may be used to show how this relates to a formal written method. $\begin{aligned} & 8 \times 59= \\ & 8 \times 60-8 \\ & 8 \times 6=48 \\ & 8 \times 60=480 \\ & 480-8=472 \end{aligned}$ <br> Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods. |  |

## Year 5-6 Multiplication

| Objective \& Strategy | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Column multiplication for 3 and 4 digits $\times 1$ digit. |  <br> I $\dagger$ is important at this stage that they always multiply the ones first. <br> Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. $321 \times 2=642$ | $x$ 300 20 7 <br> 4 1200 80 28 |  |
| Column multiplication | Manipulatives may still be used with the corresponding long multiplication modelled alongside. | Continue to use bar modelling to support problem solving |  |

## Year 6 Multiplication



## EYFS Division ?

| Objective | Concrete | Abstract |
| :--- | :--- | :--- | :--- |
| Explore how quantities <br> can be distributed <br> equally. | Use cubes, counters etc to share <br> amounts in to equal groups. | 6 shared in to 2 groups is 3 |

## Year1 Division ${ }^{\circ}$



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|  |  |  |
| :--- | :--- | :--- |

## Year 2 Division

| Objective \& Strategy | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |
| Division as sharing <br> Use Gordon ITPs for modelling | I have 10 cubes, can you share them equally in 2 groups? | Children use pictures or shapes to share quantities. <br> Children use bar modelling to show and support understanding. | $12 \div 3=4$ |

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## Year 3 Division



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## Year 3 Division

|  <br> Strategy | Concrete | Pictorial | Abstract |
| :--- | :--- | :--- | :--- |
| Division with <br> remainders. | $14 \div 3=$ | Jump forward in equal jumps on a <br> number line then see how many more you <br> need to jump to find a remainder. <br> much is left over | Limit numbers to NO remainders <br> in the answer OR carried |
|  |  |  |  |

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| Objective \& Strategy |  | For larger numbers, when it becomes inefficient to count in single multiples, bigger <br> jumps can be recorded using known facts. |
| :--- | :--- | :--- |
| Division as grouping | G | diagrams with dots or circles to help <br> them divide numbers into equal groups. |
| Use place value counters to divide using the <br> bus stop method alongside |  |  |

## Abstract

m previous work to 3 digit


For larger numbers, when it becomes inefficient to count in single multiples, bigger jumps can be recorded using known facts.
numbers


Extend to expressing results in different ways according to the context, including with remainders as fractions, as decimals or by rounding

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## Year 5/6 Division

|  <br> Strategy | Concrete | Pictorial | Abstract |
| :---: | :---: | :---: | :---: |


| Long Division |  |  | Use long division to divide numbers up to 4 digits by a 2 -digit whole number. <br> Expanded written method of long division <br> Formal written method of long division |
| :---: | :---: | :---: | :---: |

