## Saltergate Schools



## Calculation policy 2022-2023

| Reviewed and Approved by: | Governing Body |  |
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At Saltergate Primary Schools we believe that children should be introduced to the processes of calculation through active learning with practical, oral and mental activities. With the building of solid foundations and key knowledge, we expect our children to be able to understand and use appropriate methods to allow them to have mathematical success across their academic learning.

Choosing the appropriate will make sure children will have a deeper understanding and develop strategies to succeed as well as understand the development of their mathematical journey.

We want to ensure children are familiar with written methods alongside mental strategies to ensure ability to answer questions or problems with fluency but also to explain the deeper aspects of what they are doing and as to why.

This document provides a flow of progressive understanding of each of the formal methods to allow the child to have deeper understanding as to what is happening and develops through each year group.

Children should work at the approach they are suited with and only move on once they are ready and have the understanding to do so.

By the end of Year 6, children should be able to choose the most appropriate approach to solve a problem with confidence and fluency in their approach.

This policy contains the key steps to furthering calculation knowledge that is essential for deepening understanding that allows children to have a rich and broad understanding of mathematics.


Addition


## Year 1

| Vocabulary | number bonds, add, more, plus, make, sum, total, altogether, inverse double, near double, equals, is the same as (including equals sign), score, one more, two more... ten more, how many more to make...?, how many more is... than...?, how much more is....? |  |
| :---: | :---: | :---: |
|  | Method | Example/Representation |
| Children will beads or nu | aught to use a number track, line to support addition |  |
| Children will addition calcu number squ | aught how to solve simple ns with the support of a 100 | $21+7=28$  |
| Children are line for addit own for dev | ht how to use a blank number and encouraged to make their nent | $21+7=28$ $21+7=28$ |
| Children will ones when ad within the te | tion numbers into tens and g two 2-digit numbers that lie undary | $\begin{aligned} & \text { (10) } \\ & \begin{array}{l} 10+10=20 \\ 4+3=7 \\ 20+7=27 \end{array} \end{aligned}$ |
| Children will using concre representati | one-step addition problems jects and/or pictorial | I have 5 cars and I am given 3 more. How many cars do I have altogether? |
| MENTAL STRATEGIES: - Know addition can be carried out in any order (commutative) - Add 1 and 2 digit numbers to 20 including 0 - Number bonds to 20 - Doubles of numbers up to and including double 10 - Adding 10 to a single digit number - Identify 1 more than a given number |  |  |



|  | $\begin{aligned} & 13+22= \\ & T 0 \\ & 13 \\ & +22 \\ & \hline 5(3+2) \\ & \frac{30(10+20)}{35} \end{aligned}$ |
| :---: | :---: |
| Children begin to set out TO + TO (that cross the tens boundary) in columns and record as expanded column addition | $\begin{aligned} & 15+26= \\ & T 0 \\ & 15 \\ & +26 \\ & \hline 101 \\ & \hline 30 \\ & \hline 4 \\ & \hline 4 \end{aligned}$ |
| Children begin to set out TO + TO (that cross the tens boundary) in columns and record as column addition | $\begin{array}{r} 15+26= \\ T \quad 0 \\ 1 \quad 5 \\ +26 \\ \hline 4 \quad 1 \end{array}$ |
| Children begin to set out TO + TO (that cross the hundreds boundary) in columns and record as column addition <br> Visual representation, such as deans, can be used to support learning | $\begin{array}{cc} \text { Tens } & \text { Ones } \\ \\|\\|\\|\\| & \cdots \\ \|\|\mid & \because \\ \\|\\| & \begin{array}{rr} T & 0 \\ 7 & 2 \\ 3 & 3 \\ \\| & 0 \end{array} \\ \\|\\|\\|\\| & \because \end{array}$ |

Children will solve simple worded problems using appropriate visual context to solve questions involving number, quantities and measures

Column addition can be used alongside this
Max has 13 apples and Libby has 14 apples. How many apples are there all together?


MENTAL STRATEGIES: - Know that addition is the inverse of subtraction - Add numbers mentally, including: \& A 2-digit number and units \& A multiple of 10 to a 2-digit number \& Two 2-digit numbers \& Three 1-digit numbers - Use knowledge of inverse to check calculations and solve missing number problems - Use knowledge of number bonds to 10 to calculate numbers bonds to 100 - Count on in tens from any given number (e.g 19-29-39-49 etc)

| Year 3 |  |
| :---: | :---: |
| Vocabulary add, increase, total, plus, sum <br> inverse, double, near double, <br> many more to make ...? how $m$ <br> tens boundary, hundreds bou | together, column addition, estimate, , ten more... one hundred more, how e is... than ...? how much more is....?, |
| Method | Example/Representation |
| Children set out HTO + O in columns and record as column addition and then progress to HTO + TO within the tens boundary | $\begin{array}{r} 274+4= \\ H 70 \\ +\begin{array}{r} 24 \\ \hline 278 \end{array} \end{array}$ |
| Children set out HTO + TO in columns and record as column addition that cross the tens boundary <br> Any exchanges to be shown underneath the calculation | $\begin{array}{r} 246+26 \\ H \quad 10 \\ 246 \\ +\quad 2 \quad 6 \\ \hline 27 \end{array}$ |
| Children set out HTO + TO in columns and record as column addition that cross the hundreds boundary <br> Any exchanges to be shown underneath the calculation | $\begin{array}{r} 436+25 \\ H \quad T \\ 4 \\ 4 \\ 4 \end{array} \quad 6$ |


| Children set out HTO + TO in columns and record as column addition that cross the hundred and tens boundaries <br> Any exchanges to be shown underneath the calculation | $\begin{array}{r} 278+43 \\ H \quad 10 \\ 2 \quad 7 \\ +\quad 4 \\ \hline 3 \\ \hline \end{array}$ |
| :---: | :---: |
| Children set out HTO + HTO in columns and record as column addition that cross the tens boundary <br> Any exchanges to be shown underneath the calculation | $\begin{array}{r} 329+213 \\ H \quad T \quad 0 \\ +32 \\ 2 \quad 1 \\ \hline 5 \quad 4 \\ \hline \end{array}$ |
| Children set out HTO + HTO (that cross the tens and hundreds boundaries) in columns and record as column addition <br> Any exchanges to be shown underneath the calculation | $\begin{array}{r} 374+287 \\ H 1 \\ 36 \\ +28 \\ \hline 6 \end{array}$ |
| Children will solve one and two-step addition problems: <br> Can use concrete objects and pictorial representations <br> Using formal written method as they develop Including missing number problems |  |
| Pupils practise adding fractions with the same denominator <br> Use increasingly complex problems to improve fluency |  |

MENTAL STRATEGIES: - Add numbers mentally, including: $\boldsymbol{*}$ a three-digit number and a single digit number \& a 3 -digit number and multiples of $10 \div$ a 3 -digit number and multiples of 100 Estimate the answer to a calculation and use inverse operations to check answers - Know number pairs that total 1000 (multiples of 100 ) - Calculate 10 or 100 more than any given number

| Year 4 |  |
| :---: | :---: |
| Vocabulary add, addition, more, plus, in <br> double , tens boundary, hu | ease, sum, total, altogether, score, double, near eds boundary, thousands boundary, inverse |
| Method | Example/Representation |
| Children will add numbers with up to 4 -digits using the formal written method of column addition | $\begin{aligned} & 2326+1298 \\ & T h H T 0 \\ & 2326 \\ & +\quad 1 \quad 98 \\ & \hline 3624 \end{aligned}$ |
| Solve two-step problems using formal jottings and explaining reasoning behind their calculations (Bar method) | Emily has 84 cubes. She builds two towers. One tower uses 18 cubes and one tower uses 55 cubes. How many cubes does he have left over? $\begin{array}{r} 18 \\ +55 \\ \hline 73 \end{array}$ |
| Pupils continue practise in adding fractions with the same denominator <br> Increase complexity <br> Adding fractions beyond one whole | ${ }^{3} / 4+{ }_{4}^{3} / 4=\frac{6}{4}$ |

MENTAL STRATEGIES: - Add numbers mentally, including: \& a four digit number and multiples of one thousand - Use knowledge of doubles to derive related facts (e.g $15+16=31$ because $15+15$ $=30$ and $30+1=31$ ) - Know number pairs that total 1000 (multiples of 10) - Estimate the answer to a calculation and use inverse operations to check answers

| Year 5 |  |  |
| :---: | :---: | :---: |
| Vocabulary | Efficient written method, add, addition, more, plus, increase, sum, total, altogether, score, tens boundary, hundreds boundary, thousands boundary, units boundary, tenths boundary, inverse |  |
|  | Method | Example/Representation |
| Children will add numbers with more than 4digits using column addition |  |  |
| Children will add decimal numbers with the same number of decimal places using column addition |  | $\begin{array}{r} 3.24+1.13 \\ 0.0^{*} 0^{n} \\ 3.24 \\ 1.13 \\ \hline 4.37 \end{array}$ |
| Add decimal numbers with a different number of decimal places with column addition <br> Use 0 as a place holder to hold place value |  | $\begin{aligned} & 2.34+4.7 \\ & 0.0 \% \\ & 2.34 \\ & +\quad .70 \text { zero holder } \\ & \hline 7.04 \end{aligned}$ |
| Solve multi-step problems using formal methods through the policy and explaining reasoning behind their choice of operation and calculation <br> Can use other formal methods within calculation (eg subtraction) |  |  |
| Recognise mixed numbers and improper fractions and convert from one to the other |  | $1 \frac{1}{3}=\frac{4}{3}$ |
| Practise adding fractions where calculations exceed one as a mixed number |  | $2 / 5+4 / 5=6 / 5=11 / 5$ |
| MENTAL STRATEGIES: - Add numbers mentally with increasingly large numbers (e.g 10,162 + $2,300=12,462$ ) - Mentally add tenths (e.g $0.2+0.6=0.8$ ) and 1 -digit whole numbers and tenths $(8+0.3=8.3)$ - Use number bonds to 100 knowledge to calculate complements to one using hundredths (e.g $0.83+0.17=1$ ) - Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy |  |  |


| Year 6 |  |  |
| :---: | :---: | :---: |
| Vocabulary | order of operations, column addition, add, in total, answer, tens boundary, hundreds boundary, thousands boundary, millions boundary, units boundary, tenths boundary, hundredths boundary, decimal place, inverse |  |
|  | Method | Example/Representation |
| Children will add several numbers of increasing complexity |  | $\begin{array}{r} 62301 \\ 2464 \\ +\quad 2311 \\ \hline 90125 \end{array}$ |
| Children will add several decimals numbers with a different number of decimal places <br> Using 0 as a place holder where appropriate |  | $\begin{array}{r} 7.100 \\ 23.4 \\ 9.1 \\ 9.6 \\ \hline 39.6 \\ x \end{array} 983 \text { zlace holders }$ |
| Solve multi-step problems using formal written methods and explaining reasoning behind their calculations <br> Can use other formal methods within calculation (eg subtraction) |  |  |
| Add fractions different den equivalent fra | mixed numbers with nators using the concept of ns |  |
| MENTAL STRATEGIES: - Add numbers mentally with increasingly large numbers (e.g 10,162 + $2,300=12,462$ ) - Add decimal numbers mentally (up to 2 decimal places) - Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy. |  |  |



Subtraction

| EYFS |  |  |
| :--- | :--- | :---: |
|  | take (away), leave, how many are left/left over?, how many have gone?, one <br> less, two less... ten less...,how many fewer is... than...? difference between, is <br> the same as |  |
| Method |  |  |
| Using a range of practical resources and real life <br> contexts, using counting activities to develop <br> understanding of subtraction | I had 8 chocolates and I ate 2. How many have I <br> got left? |  |
| Children will use counting objects, toys or their <br> fingers to answer simple subtraction number <br> sentences | Eh.4-3=1 |  |
| Children will listen to a subtraction story and |  |  |
| draw a set of objects and cross some off |  |  |

## Year 1



## Year 2

| Vocabulary | subtract, minus, leave, how many are left/left over?, how many less is... than...?, <br> how much fewer is...?, difference between, half, halve, equals, sign, is the same <br> as, partition, inverse, count on , count back, one less, ten less... one hundred less. |
| :--- | :--- |


| Method |
| :--- |
| Children are encouraged to use a blank number <br> line to solve TO -TO and count back in tens and <br> then units by: <br> - Positioning the first number in the number <br> sentence at the end of the number line. <br> - Partitioning the second number into tens and <br> units <br> - Counting back in tens (or multiples of 10) <br> - Counting back in ones |
| Children will use their knowledge of difference <br> to use a blank number line to count on from <br> the smallest number to the largest number (in <br> tens and ones) to solve subtraction number <br> sentences (TO - TO) |

Children will solve one and two-step subtraction problems using appropriate visual context to solve questions involving number, quantities and measures

Number lines can be used alongside this

MENTAL STRATEGIES: - To know that subtraction is the inverse of addition - Use knowledge of inverse to check calculations and solve missing number problems - Subtract numbers mentally, including: \& subtracting units from a 2-digit number \& subtracting a multiple of 10 from a 2-digit number \& subtracting a 2-digit number from another 2-digit number - Recall and use subtraction facts to 20 fluently - Use knowledge of number bonds to 100 (multiples of 10) to reason ( $40+60=$ 100 so $100-60=40$ and $100-40=60$ )

## Year 3

| Vocabulary | leave, subtract, less, minus, column subtraction, inverse, decomposition, <br> exchange, how many are left/left over?, difference between, how many <br> more/fewer is... than...?, how much more/less is...?, Is the same as, equals, sign. <br> multiples of tens and hundreds. |
| :--- | :--- | :--- |
| Method | Example/Representation |
| Children begin to set out TO - TO in columns <br> and record as column subtraction that lie <br> within the tens boundary |  |


| Children begin to set out TO - TO in columns <br> and record as column subtraction with <br> decomposition that cross the tens boundary <br> In decomposition, number reduced must be <br> crossed out with one, neat, line and the new <br> value written above it |
| :--- |
| Children begin to set out HTO - TO in columns |
| and record as column subtraction that lie |
| within the tens boundary |


| Children begin to set out HTO - TO in columns and record as column subtraction with decomposition that cross the tens boundary <br> In decomposition, number reduced must be crossed out with one, neat, line and the new value written above it | $1+2-17=125$ $\begin{array}{ccc} H & T & 0 \\ 1 & 4 & 2 \\ 1 & 1 & 7 \\ \hline & 2 & 0 \\ 1 & 0 & 0 \\ \hline 1 & 2 & 5 \end{array}$ |
| :---: | :---: |
| Children begin to set out HTO - TO in columns and record as column subtraction with decomposition that cross the hundreds boundary <br> In decomposition, number reduced must be crossed out with one, neat, line and the new value written above it | $\begin{array}{ccc} 224 & -72=152 \\ H & 1 & 0 \\ 2 & 2 & 4 \\ - & 7 & 2 \\ \hline & 5 & 0 \\ 1 & 0 & 0 \end{array}$ |
| Children begin to set out HTO - TO in columns and record as column subtraction with decomposition that cross the hundreds and tens boundary <br> In decomposition, number reduced must be crossed out with one, neat, line and the new value written above it | $\left.\begin{array}{c} 321-64=257 \\ H \\ \hline \\ 2 \end{array} \begin{array}{cc} 31 & 0 \\ 2 & 11 \\ 2 & 0 \end{array}\right)$ |

Children begin to set out HTO - HTO in columns
and record as column subtraction with
decomposition that cross the hundreds and
tens boundary

| In decomposition, number reduced must be |
| :--- |
| crossed out with one, neat, line and the new |
| value written above it |


| Children will solve one and two-step |
| :--- |
| subtraction problems (including missing |
| number problems) |

Increase difficulty to improve fluency
Children practise subtracting fractions with the

## Year 4



MENTAL STRATEGIES: - Subtract numbers mentally, including: - Subtracting multiples of one thousand from a 4-digit number - Use of number pairs that total 1000 (multiples of 10) to calculate subtraction (e.g 1000-300 $=700$ ) - Estimate the answer to a calculation and use inverse operations to check answers

## Year 5

| efficient written method, subtract, subtraction, minus, decrease, difference between, inverse, decimals, units and tenths boundary, column subtraction, decomposition, exchange. |  |
| :---: | :---: |
| Method | Example/Representation |
| Children will subtract numbers with more than 4 -digits using the formal written method of column subtraction with decomposition |  |
| Children will subtract decimal numbers with the same number of decimal places with decomposition | $\begin{gathered} 5.62-2.91 \\ 0 \\ 48 \\ -\quad .6 \\ \hline 2 \end{gathered}$ |
| Solve multi-step problems using formal methods from this policy and explain their reasoning |  |
| Practise subtracting fractions where calculations exceed one as a mixed number | $\begin{aligned} & 2_{4}^{2} \cdot \frac{3}{4}=3 / 4 \\ & \left(1 / 4=\frac{3}{4}\right. \\ & 1 / 4-1 / 4=1 / 4 \end{aligned}$ |

MENTAL STRATEGIES: - Subtract increasingly large numbers mentally (e.g 12, $654-1,341=11$, 213) - Mentally subtract tenths (e.g 0.7-0.5 $=0.2$ ) and 1 -digit whole numbers and tenths ( $8-0.3=$ 7.7) - Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy

| Year 6 |  |
| :---: | :---: |
| Vocabulary order of operations, subtract, <br> tenths and hundredths boun <br> exchange. | crease, difference, inverse, decimals, units, , column subtraction, decomposition, |
| Method | Example/Representation |
| Children will subtract several numbers of increasing complexity <br> Combine numbers where appropriate to simplify the calculation | $\begin{array}{r} 7423-2376-162 \\ 2376 \end{array}{ }^{6} 7^{\prime 3 k^{\prime \prime} z^{\prime} 3}+\quad \begin{array}{r} 2538 \\ +\quad 162 \\ \hline 2538 \end{array}$ |
| Children will subtract decimal numbers with a different number of decimal places with decomposition <br> Use 0 as a place holder to help with place value in the calculation | $7.32-2.4$ <br> $\begin{array}{r}67.132 \\ -\begin{array}{l}4 \cdot 40 \\ 2\end{array} \text { zero place } \\ \hline 4 \cdot 92\end{array}$ |
| Children will subtract several decimals numbers with a different number of decimal places <br> Combine numbers where appropriate to simplify the calculation <br> Use 0 as a place holder to help with place value in the calculation |  |
| Solve multi-step problems using formal calculation methods of this policy |  |
| Subtract fractions and mixed numbers with different denominators using the concept of equivalent fractions | $\begin{gathered} \frac{7}{8}-\frac{3}{4}=\frac{1}{8} \\ \frac{\downarrow \times 2}{8} \\ \frac{7}{8}-\frac{6}{8}=\frac{1}{8} \end{gathered}$ |
| MENTAL STRATEGIES: - Subtract increasingly la 213) - Subtract decimal numbers mentally (up to answers to calculations and determine, in the co | mbers mentally (e.g $12,654-1,341=11$, cimal places) - Use estimation to check of a problem, levels of accuracy. |



Multiplication

| EYFS |  |  |
| :--- | :--- | :--- |
| Method |  |  |
| Vocabulary |  |  |
| Children will count groups of the same number <br> of objects and add them together | Count groups of 2 and then count all objects to <br> add them together. |  |
| Grouping taught through practical and pictorial <br> representations |  |  |

## Year 1

| Vocabulary | odd, even, count in twos, fives, count in tens (forwards from/backwards from), <br> how many times? lots of, groups of, once, twice, five times, ten times, multiple <br> of, times, multiply, multiply by, array, row, column, double. |
| :--- | :--- |
| Method | Example/Representation |
| Children will count groups of the same number <br> of objects and add them together. <br> The children learn about grouping in relevant <br> context using pictural support <br> Bead strings and counting sticks will be used to <br> support counting in sequences of 2 s , 5 s and <br> 10's |  |
| Children will recognise and complete patterns <br> and sequences involving multiples of 2,5 and <br> 10 |  |
| Answer ons in the bag. How <br> involving counting in multiples of 2,5 and 10 <br> and doubles. |  |
| Use concrete objects and pictorial <br> representations to support |  |
| Children will be introduced to an arrays |  |
| Build awareness to multiplication as repeated |  |
| addition |  |


| Year 2 |  |
| :---: | :---: |
| Vocabulary odd, even, twos, fives, tens, t <br> five times, ten times, multipl <br> addition, array, row, column, | rees, lots of, groups of, once, twice, three times, of, times, multiply, multiply by, repeated double. |
| Method | Example/Representation |
| Recognise and write the multiplication symbol (x) in work |  |
| Children will understand the operation of multiplication as repeated addition <br> Use a blank number line and will use practical resources to support this (use counting sticks to support this) | $5 \times 5=25$ |
| Children will be able to represent a multiplication calculation using above methods and number sentence |  |
| Children will solve one-step multiplication problems | I have 3 tigers with 10 stipes each. How many stripes do they have all together? |
| Use above methods to support this |  |
| Include missing number problems |  |

MENTAL STRATEGIES: - Count forwards and backwards in multiples of 3. - Know the 2, 5 and 10 times tables (in and out of order) - Recognise odd and even numbers

## Year 3

| Vocabulary multiply, times, groups of, <br> inverse, grid multiplication, <br> commutative, associative, p | al groups of, multiple of, multiplied by, estimate, panded column multiplication, partition, duct. |
| :---: | :---: |
| Method | Example/Representation |
| Children will learn to calculate doubles of 2digit numbers with partitioning <br> Use concrete materials alongside written representation |  |
| Children will be taught to multiply numbers (TO $x 0$ ) through partitioning for use in grid method | $\begin{gathered} 32 \times 4=136 \\ \times \\ \hline 40 \\ \hline 4 \\ \hline \end{gathered}$ |
| Children will be taught to multiply numbers (TO $x$ O) using expanded column multiplication | $\begin{array}{r} 32 \times 4=136 \\ \times \quad 32 \\ \times \begin{array}{r} 8 \\ \hline 120 \\ \hline 128 \end{array}(4 \times 30) \end{array}$ |
| Children will solve problems involving multiplication, including scaling | A bear is 2 metres tall, a giraffe is 3 times larger, how large is the giraffe? |

MENTAL STRATEGIES: - Count forwards and backwards in multiples of 4, 8, 50 \& 100 - Know the 3, 4 and 8 times tables (in and out of order) - Connect the 2,4 and 8 times tables through doubling Use knowledge of place value to calculate multiplication (e.g. $2 \times 2=4,2 \times 20=40,2 \times 200=400$ )

| Year 4 |  |
| :---: | :---: |
| multiply, multiplied by, product, short multiplication, partition, commutative, groups of, multiply, times, multiples, inverse |  |
| Method | Example/Representation |
| Children will be taught to multiply numbers (TO $\mathrm{x} O$ ) by partitioning the 2 - digit number and using two short multiplications <br> Use addition for the answers to get final answer (similar to grid method) | $\begin{array}{r} 36 \times 4=144 \\ 306 \\ \times \quad 4 \quad 120 \\ \hline 120 \\ \hline 24 \end{array}$ |
| Children will be taught to multiply numbers (TO $x 0$ ) using short multiplication | $\begin{array}{r} 46 \times 6 \\ 10 \\ \times \quad 6 \\ \hline 276 \end{array}$ |
| Children will be taught to multiply numbers (HTO \& O) by partitioning the 3 - digit number (as above for TOxO) to make 3 short multiplications <br> Use addition for the answers to get final answer (similar to grid method) | $\begin{array}{r} 243 \times 4 \\ 200 \quad 40 \\ \times \quad 4 \\ \hline 800 \quad \times 4 \\ 160 \\ 800 \\ 12 \\ +\quad 12 \\ \hline 972 \end{array}$ |
| Use short multiplication method to answer questions of up to 3 digit by one digit | $\begin{array}{r} 243 \times 4 \\ 243 \\ \times \quad 4 \\ \hline 972 \end{array}$ |
| Solve problems involving multiplying using policy procedures |  |
| MENTAL STRATEGIES: - Know all times tables up to and including $12 \times 12$ (by the end of Year 4) Recognise and use factor pairs (e.g factor pairs for numbers up to and including 10) - Know that TU $\times 5$ is TU $\times 10$ then divide by $2($ e.g $18 \times 5=(18 \times 10) \div 2=90)$ - Know that TU $\times 9$ is TU $\times 10$ then subtract TU (e.g $18 \times 9=(18 \times 10)-18=162)$ |  |

## Year 5

| Vocabulary <br> composite numbers, prime nu number, derive, factor pairs, by, multiple of, product, short scaling, decimal place, units, | ime factor, cube number, square itten method, times, multiply, multiplied cation, partition, long multiplication, d hundreds. |
| :---: | :---: |
| Method | Example/Representation |
| Children will be taught to multiply numbers (TO x TO) by partitioning the second 2 - digit number and using two short multiplications <br> Use addition to compile answers to achieve final answer | $\begin{array}{r} 34 \times 23 \\ \begin{array}{r} 344 \\ \times \quad 3 \\ \times 1080 \\ \hline 102 \\ 680 \end{array}+102 \\ \hline 782 \end{array}$ |
| Children will be taught to multiply numbers (TO x TO) using long multiplication <br> Children to exchange under the number and cross out after use to avoid confusion | $\begin{array}{r} 34 \times 23 \\ 34 \\ \times 23 \\ \hline 102 \\ +680 \\ \hline 782 \\ \hline \end{array}$ |
| Children will be taught to multiply numbers (HTO $\times$ TO) using long multiplication | $\begin{array}{r} 324 \times 32 \\ 324 \\ \times \quad 32 \\ \hline 6428 \\ \hline 9368 \end{array}$ |
| Children will be taught to multiply numbers (ThHTO $\times$ O) using short multiplication | $\begin{array}{r} 3248 \times 6 \\ 3248 \\ \times \quad 6 \\ \hline 9488 \\ x x 48 \end{array}$ |
| Children will be taught to multiply numbers (ThHTO $\times$ TO) using long multiplication | $\begin{array}{r} 3246 \times 23 \\ 3246 \\ \times \quad 23 \\ \hline 9738 \\ 649 \times 20 \\ \hline 74658 \\ \times+\quad \end{array}$ |


| Multiply whole integers as well as involving decimals by 10, 100 and 1000 <br> Focus on the decimal staying in place <br> The digits move in place value | $\begin{aligned} & 41 \times 10 \\ & 41 \times 100 \\ & 41 \times 1000 \end{aligned}$ $\begin{array}{lllllll} 10_{\text {In }} & \text { Th } & \mathrm{H} & T & 0 & \\ & & 4 & 1 & 1 & 0 & \times 10 \\ & 4 & 1 & 0 & 0 & \times 100 \\ & 1 & 0 & 0 & 0 & \times 1000 \end{array}$ |
| :---: | :---: |
| Children will solve problems involving multiplication, including scaling | Alfie runs 3400 m on Sports Day. His friend, Harry, runs three times as far. How far does Harry run? |
| Multiply proper fractions and mixed numbers by whole numbers <br> Concrete materials or diagrams can be used in support of showing abstract representation | $\begin{aligned} & \frac{1}{4} \times 2=\frac{2}{4} \quad \rightarrow \\ & 1 \frac{1}{4} \times 2=2 \frac{2}{4} \quad \rightarrow \end{aligned}$ |
| MENTAL STRATEGIES: - Recognise and calculate factor pairs for any number - Use times table knowledge to derive multiples of any number - Establish whether a number is a prime number (up to 100 ) or a composite number (not prime) and recall prime numbers up to 19 - To know what a square number is and recall all square numbers (up to and including 144) - To know what a cube number is and recall the first 5 cube numbers |  |


| Year 6 |  |  |
| :---: | :---: | :---: |
| Vocabulary | common factors, multiples, prime, formal written method, multiply, multiplied by, multiple of, product, short and long multiplication, partition, scaling, decimal place, units, tenths and hundredths. |  |
|  | Method | Example/Representation |
| Multiply numbers by 10,100 and 1000 up to three decimal places as a starting point |  |  |
| Multiply one-digit numbers (up to two decimal places) by whole numbers <br> Using appropriate multiplication method to achieve this |  |  |
| Multiply multi-digit numbers using long multiplication |  |  |
| Multiply simple pairs of fractions with ability to show the answer in its simplest form |  | $\frac{x}{4} \times \frac{1}{2}=\frac{1}{8}$ |
| MENTAL STR using the rule digits in the common fact and determin | GIES: - Use scaling to solve dec e number of decimal digits in er' - Identify common factors, o simplify fractions mentally the context of a problem, lev | ber problems as whole number problems on is the same as the number of decimal multiples and prime numbers - Use ation to check answers to calculations racy |



Division

| EYFS |  |  |
| :--- | :--- | :--- |
| Vocabulary | halve, half, share, share equally, groups |  |
| Method |  |  |
| Share objects amongst groups and state how <br> many are in each group <br> Verbal explanation |  |  |


| Year 1 |  |
| :--- | :--- | :--- |
| Vocabulary | halve, share, share equally, groups, equal groups of, divide, divided by, left, left over |
| Method |  |
| Understand that share means equal and be able to do <br> this practically | Share 9 bears between 3 people equally: |

## Year 2

| Vocabulary | Mroups of, equal groups of, halve, share, share equally, divide, divided by, divided into, repeated <br> subtraction, inverse. |
| :--- | :--- | :--- |
| Method |  |
| Understand division as grouping using repeated <br> subtraction on a prepared number line |  |
| Represent a division calculation using an array | Cxample/Representation |

MENTAL STRATEGIES: - To know that division is the inverse of multiplication - Recall division facts for the 2,5 and 10 times tables - Recall halves for even numbers up to and including 20

| Year 3 |  |
| :---: | :---: |
| Vocabulary divided by, divide, divided into, group | divisor, short division, remainder, inverse. $\text { divisor } \frac{\text { quotient }}{\text { Jdividend }}$ |
|  | Example/Representation |
| Introduce short division method and will be encouraged to use multiples of the divisor to assist ( $\mathrm{TO} \div \mathrm{O}$ ) <br> Use practical or pictorial representation to support |  |
| Children will use practical resources to support solving division number sentences with remainders ( $\mathrm{TO} \div \mathrm{O}$ ) alongside short division |  |
| Pupils connect tenths to place value, decimal measures and that tenths is to divide by 10 |  |

MENTAL STRATEGIES: - Know the division facts from the 3,4 and 8 times tables - Use knowledge of place value to calculate division (e.g. $14 \div 2=7,140 \div 2=70,1400 \div 2=700$ )

| Year 4 |  |
| :---: | :---: |
| Vocabulary factor, divisor, divided by, div <br> short division, derive, Quotie | into, remainders, divisible by, equivalent, verse, remainder, multiples, exchange. $\text { divisor } \frac{\text { quotient }}{\text { Jdividend }}$ |
| Method | Example/Representation |
| Children will use practical resources to support solving division number sentences with remainders ( $\mathrm{HTO} \div \mathrm{O}$ ) | $\begin{aligned} & 243 \div 2 \\ & 2 \longdiv { 2 4 3 } \end{aligned}$ |
| Children will use practical resources to support the short division method where exchange across place value columns occurs. (HTO $\div \mathrm{O}$ ) <br> Cross out the number if exchange if the whole number, or write to the top left the number exchanged to the new place value |  |
| Find the effect of dividing a 1 or 2-digit number by 10 and 100 <br> Identifying the value of the digits in the answer as ones, tenths and hundredths | $\begin{aligned} & 8 \div 10 \\ & 8 \div 100 \\ & 0.8 \quad 8 \\ & 8 \cdots 8 \\ & 0.0 \\ & 0.0 \end{aligned}$ |

Count up and down in hundredths

Recognise that hundredths arise when dividing an object by a hundred

Or dividing by 10 and 10 again


What should I cut my pizza into if I have 100 people to serve?

MENTAL STRATEGIES: - Know all related division facts for all times tables up to 12 times table (by the end of Year 4)

| Year 5 |  |  |
| :---: | :---: | :---: |
| Vocabulary | divide, divided by, divided into, divisible by, remainder, quotient, inverse, decomposing, factor, decimal place, units, tenths, scaling, short division.$\text { divisor } \frac{\text { quotient }}{\text { Jdividend }}$ |  |
|  | Method | Example/Representation |
| Use short division to solve division number sentences with remainders (HTO $\div \mathrm{O}$ ) <br> In exchanges, cross out the number if exchange if the whole number, or write to the top left the number exchanged to the new place value |  | $\begin{aligned} & 425 \div 5=85 \\ & 5 \sqrt{44^{4} 2^{2} 5} \end{aligned}$ |
| Learn to divide whole numbers and those involving decimals by 10,100 and 1000 <br> Decimal remains in place and it is the integers that move place values. |  |  |
| Solve worded problems with appropriate method as shown in the policy |  |  |
| MENTAL STR fractions with | IES: - Multiply and divide number sion | y drawing upon known facts - Associate |


| Year 6 |  |  |
| :---: | :---: | :---: |
| Vocabulary | divide, divided by, divided into, divisible by, remainder, factor, quotient, inverse, decimal place, units, tenths, hundredths, scaling, formal written methods.$\text { divisor } \frac{\text { quotient }}{\text { Jdividend }}$ |  |
| Method <br> Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division |  | Example/Representation |
|  |  |  |
| Be able to answer division questions with decimal remainders |  | $\begin{array}{r} 735 \div 6 \\ \frac{122 \cdot 5}{6} \begin{array}{r} 73^{\prime} 5 \cdot 0 \end{array} \end{array}$ |
| Divide numbers decimal numbers with up to 3 decimal places by 10,100 and 1000 <br> Decimal remains in place and it is the integers that move place values. |  | $\begin{aligned} & 41.6 \div 10 \\ & 41.6 \div 100 \\ & 41.6 \div 1000 \\ & 10.6 \% \\ & 4 \\ & 4 \\ & 4 \\ & 4 \end{aligned} .6106$ |
| Be able to answer division questions with decimal remainders or whole number remainders |  |  |
| Divide proper | tions by whole numbers | ${ }^{1} / 3 \div 2={ }^{1} / 6$ <br> $\square \div 2=$ <br> $(\square=\theta)$ <br> $\theta \div 2=\Delta$ |
| MENTAL STRATEGIES: - Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy - Calculate a fraction of an amount |  |  |

