'Shine like a lantern in the presence of the Lord.'


# YEAR 3 AND 4 MATHEMATICS CALCULATION METHODS 

```
Always think:
Can I do it mentally?
Can I do it with jottings?
Do I need a written method (vertical layout)?
Do I need a calculator?
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## MENTAL ADDITION GUIDELINES

Year 3
(MENTAL CALCULATION supported with jottings)
(MENTAL CALCULATION supported with jottings)

| MENTALADDITIN GUIELINES |  |
| :---: | :---: |
| Year 3 <br> (MENTAL CALCULATION supported with jottings) | Year 3 <br> (MENTAL CALCULATION supported with jottings) |
| Using Place <br> Count in 100s number line for e.g. Know 475 675 <br> Value (KF) (initially using a support) +200 as 475,575 , <br> Add multiples of 10, 100 and $£ 1$ (KF) <br> e.g. $746+200$ <br> e.g. $746+40$ <br> e.g. $£ 6 \cdot 34+£ 5$ as $£ 6+£ 5$ and 34 p <br> Partitioning (KF) $\text { e.g. } \begin{aligned} £ 8 \cdot 50+£ 3 \cdot 70 & =£ 8+£ 3+50 p+70 p \\ & =£ 11+£ 1 \cdot 20 \end{aligned}$ $\text { e.g. } 347+36=300+40+30+7+6$ $=300+70+13$ $=383$ $\text { e.g. } \begin{aligned} 68+74 & =60+70+8+4 \\ & =130+12 \\ & =142 \end{aligned}$ | Counting on <br> Add two 2 -digit numbers by adding the multiple of 10 , then the 1 s $\text { e.g. } 67+55 \text { as } 67+50(117)+5=122$ <br> Add near multiples of 10 and 100 (Adjusting Method) <br> e.g. $67+39$ <br> e.g. $364+199$ <br> Add pairs of 'friendly' 3-digit numbers <br> e.g. $548+120$ <br> Count on from 3-digit numbers $\text { e.g. } 247+34 \text { as } 247+30(277)+4=281$ <br> Using number facts (KF) <br> Know pairs which total each number to 20 <br> e.g. $7+8=15$ <br> e.g. $12+6=18$ <br> Number bonds to 100 (support with practical apparatus) <br> e.g. $46+54$ <br> e.g. $73+27$ <br> e.g. $35+65$ <br> $0000000000000000000000000000000000-0000000000000000000000000000000000000000000000000000000000000000$ <br> 35 <br> 65 <br> Add to the next 10 and the next 100 <br> e.g. $176+4=180$ <br> e.g. $435+65=500$ |

## MENTAL ADDITION GUIDELINES

## Year 4

(MENTAL CALCULATION supported with jottings)

## Using place value (KF)

Count in 1000s
e.g. Know $3475+2000$ as $3475,4475,5475$

Partitioning (KF)
e.g. $746+40$
e.g. $746+203=700+40+6+200+3$
$=900+40+9$
$=949$
e.g. $134+707=100+700+30+4+7$
$=800+30+11$
$=830+11$
$=841$
e.g. $358+73=358+70+3$
$=428+3$
$=431$


A number line can be used to support children with their counting on (J10 Method).

## Counting on

Add 2 -digit numbers to 2,3 and 4 -digit numbers by adding the
multiple of 10 then the 1 s
e.g. $167+55$ as $167+50(217)+5=222$

Recognise like fractions that add to 1 (KF)
e.g. $1 / 4+3 / 4$
e.g. $3 / 5+2 / 5$

## Year 4

(MENTAL CALCULATION supported with jottings)
Add near multiples of 10, 100 and 1000 (KF) (Adjusting Method)
e.g. $467+199$
e.g. $3462+2999$


Count on to add 3-digit numbers and money
e.g. $463+124$ as $463+100(563)+20(583)+4=587$

+ e.g. $£ 4.67+£ 5.30$ as $£ 9.67+30$ p


## Using number facts (KF)

Number bonds to 100 and to the next multiple of 100
e.g. $288+12=300$
e.g. $1353+47=1400$
e.g. $463+37=500$

J10 / T10
Method


Number bonds to $£ 1$ and to the next whole pound (KF)
e.g. $63 p+37 p=£ 1$
e.g. $£ 3 \cdot 45+55 p=£ 4$

Add to the next whole number (KF)
e.g. $4 \cdot 6+0.4$
e.g. $7 \cdot 2+0.8$

## Add like fractions

e.g. $3 / 8+1 / 8+1 / 8$

| WRITEN ADDITIN GUIDELINES |  |
| :---: | :---: |
| Year 3 <br> Written Addition | Year 4 <br> Written Addition |
| Build on partitioning to develop expanded column addition with two 3-digit numbers <br> e.g. $466+358$ $\begin{array}{r} 40060 \quad 6 \\ +\quad 30050 \quad 8 \\ \hline 700110 \quad 14 \\ \hline \end{array}$ <br> Use expanded column addition where digits in a column add to more than the column value <br> e.g. $466+358$ $\begin{array}{r} 400606 \\ 30050 \\ +\quad 100 \\ \hline 10 \\ \hline 800 \\ \hline \end{array}$ <br> Compact column addition with two or more 3-digit numbers or towers of 2-digit numbers e.g. $347+286+495$ $\begin{array}{r} 347 \\ 286 \\ +\quad 495 \\ \hline \quad 21 \\ \hline 1128 \\ \hline \end{array}$ <br> Compact column addition with 3- and 4-digit numbers | Build on expanded column addition to develop compact column addition with larger numbers <br> e.g. $1466+4868$ $\begin{array}{r} 1000400606 \\ 4000 \\ 800 \\ \hline 100 \\ \hline 100 \\ \hline 100 \\ \hline 6000 \\ \hline 300 \\ \hline \end{array}$ <br> Compact column addition with larger numbers e.g. $5347+2286+1495$ $\begin{array}{r} 5347 \\ 2286 \\ +1495 \\ 121 \\ \hline 9128 \\ \hline \end{array}$ <br> Use expanded and compact column addition to add amounts of money. |

## MENTAL SUBTRACTION GUIDELINES

## Year 3

(MENTAL CALCULATION supported with jottings and practical apparatus)

## Taking away

Use place value (KF) to subtract
e.g. 348 - 300
e.g. $348-40$
e.g. $348-8$

Take away multiples of 10,100 and $£ 1$
e.g. $476-40=436$
e.g. $476-300=176$
e.g. $£ 4 \cdot 76-£ 2=£ 2 \cdot 76$

Partitioning (KF)
e.g. $68-42$ as $60-40$ and $8-2$
e.g. $£ 6 \cdot 84-£ 2 \cdot 40$ as $£ 6-£ 2$ and $80 p-40$ p

Count back in 100s, 10 s then 1 s
e.g. $763-121=763-100-20-1$

$$
\begin{aligned}
& =663-20-1 \\
& =643-1 \\
& =642
\end{aligned}
$$



Subtract near multiples of 10 and 100 (Adjusting method)
e.g. 648-199
e.g. $86-39$
(MENTAL CALCULATION supported with jottings and practical apparatus)

## Counting up

Find a difference between two numbers by counting up from the smaller to the larger e.g. $132-117=15$


## Using number facts

Know pairs which total each number to 20 (KF)
e.g. $20-14=6$

Number bonds to 100 (KF)
e.g. $100-48=52$
e.g. $100-35=65$

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Subtract using number facts to bridge back through a 10 (T10 Method)
e.g. $42-5=42-2$
= $40-3$
$=37$

| MENTALSUBTRACTON GUIDELNES |  |
| :---: | :---: |
| Year 4 (MENTAL CALCULATION supported with jottings) | Year 4 (MENTAL CALCULATION supported with jottings) |
| Taking away <br> Use place value to subtract <br> e.g. $4748-4000$ <br> e.g. $4748-8$ <br> Take away multiples of $10,100,1000, £ 1,10$ p or $0 \cdot 1$ <br> e.g. $8392-50$ <br> e.g. $6723-3000$ <br> e.g. $£ 3.74-30 \mathrm{p}$ <br> e.g. 5.6-0.2 <br> Partitioning <br> e.g. $£ 5.87-£ 3.04$ as $£ 5-£ 3$ and $7 p-4 p$ <br> e.g. $7493-2020$ as $7000-2000$ and $90-20$ <br> Count back $\text { e.g. } \begin{aligned} 6482-1301 & =6482-1000-300-1 \\ & =5482-300-1 \\ & =5182-1 \\ & =5181 \end{aligned}$ | Subtract near multiples of 10, 100, 1000 or $£ 1$ (Adjusting Method) <br> e.g. 3522 - 1999 <br> e.g. £34.86-£19.99 <br> Counting up <br> Find a difference between two numbers by counting up from the smaller to the larger e.g. $754-568$ <br> e.g. $4000-2693$ <br> Using number facts <br> Number bonds to 10 and 100 and derived facts (KF) <br> e.g. $100-76=24$ <br> e.g. $1-0.6=0.4$ <br> Number bonds to $£ 1$ and $£ 10$ (KF) <br> e.g. $£ 1 \cdot 00-86 p=14 p$ <br> e.g. $£ 10 \cdot 00-£ 3 \cdot 40=£ 6 \cdot 60$ |


| WRITTEN SUBTRACTION GUDELINES |  |
| :---: | :---: |
| Year 3 Written Subtraction | Year 4 Written Subtraction |
| Develop counting up subtraction e.g. $200-167$ $3+30=33$ <br> Use counting up subtraction to find change from $£ 1, £ 5$ and $£ 10$ e.g. £10.00-£6.84 $6 p+10 p+£ 3.00=£ 3.16$ <br> Recognise complements of any fraction to 1 (KF) $\begin{aligned} & \text { e.g. } 1-1 / 4=3 / 4 \\ & \text { e.g. } 1-3 / 5=2 / 5 \end{aligned}$ | Expanded column subtraction with 3 and 4-digit numbers <br> e.g. 345-123 <br> e.g. 726-358 <br> (with no repartitioning) <br> (including repartitioning) <br> Begin to develop compact column subtraction <br> e.g. $726-358$ $\begin{array}{r} 61116 \\ 7 \not 2 \end{array} 8$ <br> Use counting up subtraction to find change from £10, £20, £50 and £100 <br> e.g. Buy a computer game for $£ 34.75$ using $£ 50$ <br> Subtract like fractions <br> e.g. $3 / 8-1 / 8=2 / 8$ <br> e.g. $3 / 5-2 / 5=1 / 5$ |

## MENTAL MULTIPLICATION GUIDELINES

## Year 3

(MENTAL CALCULATION supported with jottings and practical apparatus)
Counting in steps ('clever' counting)
Count in $2 \mathrm{~s}, 3 \mathrm{~s}, 4 \mathrm{~s}, 5 \mathrm{~s}, 8 \mathrm{~s}$ and 10s (KF)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |



Initially all counting on should be supported with practical apparatus / resources.
(MENTAL CALCULATION supported with jottings and practical apparatus)

## Doubling and halving (KF)

Find doubles of numbers to 50 using partitioning e.g. double 48


Use doubling as a strategy in multiplying by 2
e.g. $18 \times 2$ is double $18=36$

## Grouping (KF)

Recognise that multiplication is commutative
e.g. $4 \times 8=8 \times 4$

Multiply multiples of 10 by 1-digit numbers
e.g. $30 \times 8=240$

Multiply 'friendly' 2-digit numbers by 1-digit numbers
e.g. $13 \times 4$

## Using number facts (KF)

Know doubles to double 20
e.g. double 15 is 30

Know doubles of multiples of 5 to 100
e.g. double 85 is 170

Know $\times 2, \times 3, \times 4, \times 5, \times 8, \times 10$ tables facts

## MENTAL MULTIPLICATION GUIDELINES

## Year 4

(MENTAL CALCULATION supported with jottings and practical apparatus)

## Counting in steps (sequences)

Count in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 11s, 12s, 25s, $50 \mathrm{~s}, 100 \mathrm{~s}$ and 1000s (KF)


## Doubling and halving

Find doubles to double 100 (KF) and beyond using partitioning e.g. double 126


Begin to double amounts of money e.g. $£ 3.50$ doubled is $£ 7$


Use doubling as a strategy in multiplying by 2, 4 and 8 (KF) e.g. $34 \times 4$ is double $34(68)$ doubled again $=136$

Year 4
(MENTAL CALCULATION supported with jottings and practical apparatus)

## Grouping

Use partitioning to multiply 2-digit numbers by 1-digit numbers e.g. $24 \times 5$


Multiply multiples of 100 and 1000 by 1-digit numbers using tables facts (KF) e.g. $400 \times 8=3200$

Multiply near multiples by rounding
e.g. $24 \times 19$ as $(24 \times 20)-24=456$

## Using number facts

Know times-tables up to $12 \times 12$

|  | 1 | 2 | 3 | 4 |  | 5 |  |  |  |  | 10 |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1 | 2 | 3 |  |  | 5 | 6 |  |  | 9 |  |  |  | 12 |
| 2 | 2 | 4 |  |  |  | 10 | 12 | 14 | 16 | 18 | 20 |  |  | 26 |
| 3 | 3 | 6 | 9 |  |  | 5 | 18 | 21 | 26 | 27 | 30 |  | 22 | 36 |
| 4 | 4 | 8 | 12 |  |  | 20 | 24 | 28 | 32 | 36 | 40 |  |  | 48 |
| 5 | 5 | 10 | 15 |  | 20 | 25 | 30 | 35 | 40 | 45 | 50 |  |  | 60 |
| 6 | 6 | 12 | 18 |  | 43 | 30 | 36 | 42 | 48 | 56 | 60 |  |  |  |
| 7 | 7 | 14 | 21 |  |  | 35 | 42 | 49 | 56 | 66 | 70 |  | 66 |  |
| 8 | 8 | 16 | 24 |  |  | 40 | 48 | 56 | 64 | 72 | 20 |  |  | 96 |
| 9 | 9 | 18 | 27 |  |  | 45 | 54 | 63 | 72 | я | 90 |  | as | 108 |
| 10 | 10 | 20 | 30 |  |  | 50 | 60 | 70 | 0 | 90 |  |  | ง | 120 |
| " | 1 | 22 | 33 |  |  | 55 | 66 | 77 |  | ¢9 |  |  | 12 |  |
| 12 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



## MENTAL DIVISION GUIDELINES

## Year 3

(MENTAL CALCULATION supported with jottings and practical apparatus)

## Counting in steps ('clever' counting)

Count in $2 \mathrm{~s}, 3 \mathrm{~s}, 4 \mathrm{~s}, 5 \mathrm{~s}, 8 \mathrm{~s}$ and 10 s (KF)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |



Initially all counting on should be supported with practical apparatus resources.

## Doubling and halving (KF)

Find half of even numbers to 100 using partitioning e.g. find half of 48


Use halving as a strategy in dividing by 2
e.g. $36 \div 2$ is half of $36=18$

Find half of odd numbers
(MENTAL CALCULATION supported with jottings and practical apparatus)

## Grouping

Recognise that division is not commutative (KF)
e.g. $16 \div 8$ does not equal $8 \div 16$

Relate division to multiplications 'with holes in' (KF)
e.g. $\times 5=30$ is the same calculation as $30 \div 5=$ _ thus we can count in 5 s to find the answer


Divide multiples of 10 by 1 -digit numbers (KF)
e.g. $240 \div 8=30$

Begin to use subtraction of multiples of 10 of the divisor to divide numbers above the $10^{\text {th }}$ multiple
e.g. $52 \div 4$ is $10 \times 4(40)$ and $3 \times 4(12)=13$

## Using number facts

Know half of even numbers to 40 (KF)
Know half of multiples of 10 to 200 (KF)
e.g. half of 170 is 85

Know $\times 2, \times 3, \times 4, \times 5, \times 8, \times 10$ division facts (KF)

## MENTAL DIVISION GUIDELINES

## Year 4

(MENTAL CALCULATION supported with jottings and practical apparatus)

## Counting in steps (sequences)

Count in $2 \mathrm{~s}, 3 \mathrm{~s}, 4 \mathrm{~s}, 5 \mathrm{~s}, 6 \mathrm{~s}, 7 \mathrm{~s}, 8 \mathrm{~s}, 9 \mathrm{~s}, 10 \mathrm{~s}, 11 \mathrm{~s}, 12 \mathrm{~s}, 25 \mathrm{~s}, 50 \mathrm{~s}, 100 \mathrm{~s}$ and 1000s (KF)


## Doubling and halving

Find half of even numbers to 200 (KF) and beyond using partitioning e.g. find half of 258


Begin to halve amounts of money
e.g. $£ 9$ halved is $£ 4.50$


Use halving as a strategy in dividing by 2,4 and 8
e.g. $164 \div 4$ is half of 164 (82) halved again $=41$
(MENTAL CALCULATION supported with jottings and practical apparatus)

## Grouping

Use multiples of 10 times the divisor to divide by 1 -digit numbers above the tables facts
e.g. $45 \div 3$ as $10 \times 3(30)$ and $5 \times 3(15)$

$$
\begin{aligned}
& 45 \div 3=\square \\
& \square \times 3=45 \\
& 10 \times 3=30 \\
& \begin{array}{r}
15 \\
5 \times 3=15 \\
\hline 15
\end{array} \quad 45 \div 3=15 \\
& \begin{array}{l}
4
\end{array} \\
& \begin{array}{l}
4
\end{array} \\
& \begin{array}{l}
15
\end{array} \\
& \hline
\end{aligned}
$$

Divide multiples of 100 by 1-digit numbers using division facts e.g. $3200 \div 8=400$

## Using number facts

Know times-tables up to $12 \times 12$ and all related division facts (KF)

| $\mathbf{x}$ | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{6}$ | 7 | 8 | $\mathbf{9}$ | 10 | 11 | $\mathbf{2}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{1}$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| $\mathbf{2}$ | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 11 | 24 |
| $\mathbf{3}$ | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 22 | 36 |
| 4 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 33 | 48 |
| 5 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 44 | 60 |
| 6 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 55 | 72 |
| 7 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 66 | 84 |
| 8 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 77 | 96 |
| 9 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 88 | 108 |
| 10 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 99 | 120 |
| $\mathbf{1 1}$ | 11 | 22 | 33 | 44 | 55 | 65 | 77 | 88 | 99 | 100 | 121 | 132 |
| 12 | 12 | 24 | 36 | 48 | 50 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |


| WRITTEN DIVISION GUIDELINES |  |
| :---: | :---: |
| Year 3 Written Division | Year 4 Written Division |
| Perform divisions just above the 10th multiple using written jottings, supported by a mental method; understand how to give a remainder as a whole number. <br> Use division facts to find unit and simple non-unit fractions of amounts within the times-tables. <br> e.g. $3 / 4$ of 48 is $3 \times(48 \div 4)=36$ | Use a written version of a mental method to divide 2-and 3-digit numbers by 1-digit numbers. <br> e.g. $86 \div 3$ as $20 \times 3(60)$ and $8 \times 3(24)$, remainder 2 $\begin{aligned} & 86 \div 3=\square \\ & \square \times 3=86 \\ & \begin{array}{r} 20 \times 3=60 \\ 26 \end{array} \\ & \begin{array}{r} 8 \times 3=24 \\ 28 \end{array} \end{aligned}$ <br> Use chunking $\begin{aligned} & 86 \div 3 \\ & 86 \\ & -\frac{60}{26}(20 \times 3) \\ & -\frac{24}{2}(8 \times 3) \end{aligned}$ <br> Answer: $20+8=28 \mathrm{r} 2$ $3 \times 10=30$ <br> Use division facts to find unit and non-unit fractions of amounts within the timestables <br> e.g. $7 / 8$ of 56 is $7 \times(56 \div 8)=48$ |

