

# How we teach Calculation at Chilton Primary



## Parents' Guide



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# Foreword

We have recently revised our policy for teaching calculation strategies within the school in light of new government initiatives. This policy aims to ensure that we teach pupils using a progressive and consistent approach so they can apply effective strategies when calculating.

It emphasises the importance of mental methods and the need for pupils to be secure with these before moving onto written calculation strategies. We believe this promotes the best understanding of calculation and as a result of this, pupils will always be encouraged to think about whether or not a calculation can be done mentally first.

We also want to provide our pupils with a range of strategies for solving problems and calculations and therefore enable them to select the most efficient method for each calculation, this may be mental, written or calculator based.

Formal written calculations are not taught until we believe the pupils have a sound understanding of mental strategies, regardless of their age or year group. It is unlikely, therefore, that pupils will be calculating using formal written methods until they are in Year 4, 5 or 6, an approach supported by the Renewed Primary Strategy for Mathematics.

Hopefully this booklet will give you an insight into the strategies we teach for each operation and in which order! The best way you can support your child is by helping them learning their number facts to 20 and times tables, and reinforcing the methods we teach in school.

*If you have any further questions or queries please do not hesitate to contact us!*

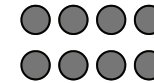


# Glossary

## ARRAY -

A collection of dots to represent a multiplication fact e.g.

$$4 \times 2 = 8$$



## DIVIDEND -

The number which will be divided in a division calculation e.g.

$$96 \div 8 = 12$$



dividend

## DIVISOR -

A number by which another number is divided e.g.

$$96 \div 8 = 12$$



divisor

## HTU -

Stands for headings used to represent place value columns: Hundreds, Tens and Units

## INFORMAL JOTTINGS -

Notes that are used to keep track of a mental calculation e.g. a numberline

## MULTIPLES -

Numbers that another number will divide exactly into e.g. 60, 90 and 120 are multiples of 10

## MULTIPLIER -

A number by which another number is multiplied e.g.

$$16 \times 8 = 128$$



multiplier

# Written ÷

## 1. Vertical repeated subtraction

$$64 \div 11 = \underline{5} \text{ r}9$$

$$\begin{array}{r}
 64 \\
 -11 \\
 \hline
 53 \\
 -11 \\
 \hline
 42 \\
 -11 \\
 \hline
 31 \\
 -11 \\
 \hline
 20 \\
 -11 \\
 \hline
 9
 \end{array}$$

## 2. Chunking - initially where the divisor is a single digit, progressing to the divisor being TU

$$445 \div 3 = \underline{148} \text{ r}1$$

$$\begin{array}{r}
 3 \overline{)445} \\
 \underline{300} \text{ (100} \times 3) \\
 145 \\
 \underline{120} \text{ (40} \times 3) \\
 25 \\
 \underline{24} \text{ (8} \times 3) \\
 1
 \end{array}$$

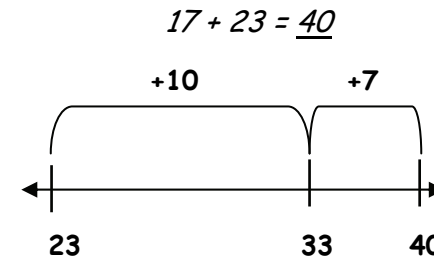
## 3. Standard Short Division

$$\begin{array}{r}
 \underline{148} \text{ r}1 \\
 3 \overline{)445}
 \end{array}$$

# Mental +

These strategies can be taught in any order and will be regularly revisited in each year group using numbers which are age and ability appropriate. Pupils will be encouraged to support their mental methods with informal jottings when necessary.

- *Reordering - counting on from the largest number even if it does not appear first in the calculation*



- *adding numbers which make 10 or 100 first*

$$\begin{array}{l}
 48 + 24 + 52 = \underline{124} \\
 48 + 52 = 100 \qquad 100 + 24 = 124
 \end{array}$$

- *Partitioning - split numbers into multiples of 1/10/100 and add them in their parts*

$$\begin{array}{l}
 48 + 36 = \underline{84} \\
 48 + 30 + 6 = 78 + 6 = 84 \\
 \text{OR} \\
 40 + 30 + 8 + 6 = 70 + 14 = 84
 \end{array}$$

- *Rounding and Compensating - changing numbers to multiples of 10/100 and adjusting once added*

$$\begin{array}{l}
 42 + 19 = \underline{61} \\
 42 + 20 = 62 \qquad 62 - 1 = 61
 \end{array}$$

# Written +

## 1. Expanded Method in Columns

- adding the tens first

$$\begin{array}{r} 76 \\ 47 \\ \hline 110 \\ 13 \\ \hline 123 \end{array}$$

- adding the units first

$$\begin{array}{r} 76 \\ 47 \\ \hline 13 \\ 110 \\ \hline 123 \end{array}$$

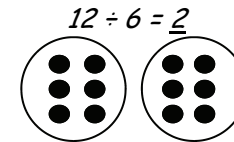
## 2. Standard Column Method - progressing to larger numbers, and decimal numbers

$$\begin{array}{r} 76 \\ 47 \\ \hline 123 \\ 11 \end{array}$$

# Mental ÷

These strategies need to be taught in order but will be regularly revisited in each year group using numbers which are age and ability appropriate. Pupils will be encouraged to support their mental methods with informal jottings when necessary.

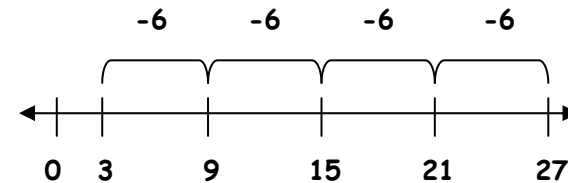
## 1. Pictorial grouping and sharing - progressing from seeing multiplication as an array



## 2. Repeated addition or subtraction

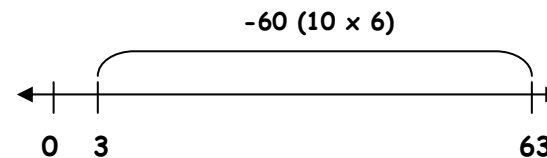
- using a numberline, adding/subtracting 1 group of the divisor at a time

$$27 \div 6 = 4 \text{ r}3$$



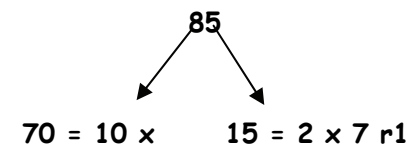
- using a numberline, adding/subtracting more than 1 group of divisor at a time

$$63 \div 6 = 10 \text{ r}3$$



## 3. Partitioning - splitting the dividend into parts which are known facts

$$85 \div 7 = 12 \text{ r}1$$



# Written x

1. Grid Method - initially with (H)TU x U but extending to (H)TU x TU and the multiplication of decimal numbers

$$34 \times 23 = \underline{782}$$

X	20	3
30	600	90
4	80	12

$$600 + 90 + 80 + 12 = 782$$

2. Standard Short and Long Multiplication

$$76 \times 7 = \underline{532}$$

$$\begin{array}{r} 76 \\ 7 \\ \hline 532 \\ 4 \end{array}$$

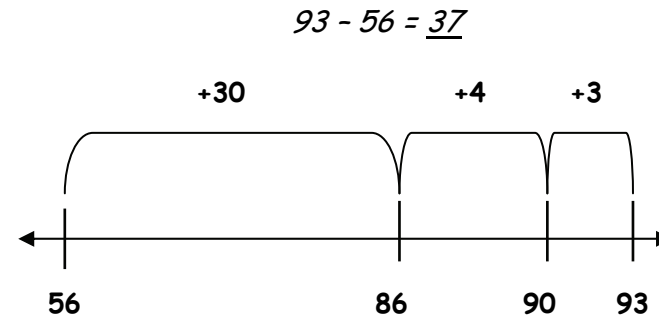
$$76 \times 47 =$$

$$\begin{array}{r} 2 \\ 4 \\ 76 \\ 47 \\ \hline 532 \\ 3040 \\ \hline 3572 \end{array}$$

# Mental -

These strategies can be taught in any order and will be regularly revisited in each year group using numbers which are age and ability appropriate. Pupils will be encouraged to support their mental methods with informal jottings when necessary.

- Counting on - counting on from the smallest number to the biggest to find a difference



- Rounding Compensating - changing numbers to multiples of 10/100 and adjusting once subtracted

$$42 - 19 = \underline{23}$$

$$42 - 20 = 22 \quad 22 + 1 = 23$$

# Written -

1. Expanded Method - using partitioning, no borrowing required

$$563 - 241 = \underline{322}$$

$$\begin{array}{r} 500 \ 60 \ 3 \\ 200 \ 40 \ 1 - \\ \hline 300 \ 20 \ 2 = 322 \end{array}$$

- using partitioning, borrowing required

$$563 - 278 = \underline{285}$$

$$\begin{array}{r} 500 \ 60 \ 3 \rightarrow 400 \ 150 \ 13 \\ 200 \ 70 \ 8 \rightarrow \underline{200 \ 70 \ 8} \\ \hline 200 \ 80 \ 5 \qquad = 285 \end{array}$$

2. Standard Column Method - progressing to larger numbers, more numbers and decimal numbers

$$\begin{array}{r} 51 \\ 5 \cancel{6} 3 \\ 278 - \\ \hline 285 \end{array}$$

# Mental x

These strategies can be taught in any order and will be regularly revisited in each year group using numbers which are age and ability appropriate. Pupils will be encouraged to support their mental methods with informal jottings when necessary.

• *Partitioning* - split numbers into multiples of 1/10/100 and then recombine after multiplying

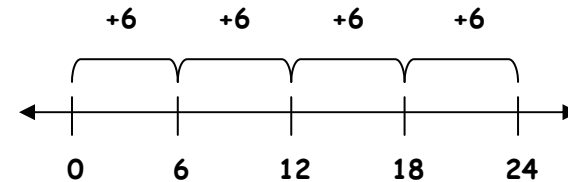
$$\begin{array}{l} 43 \times 6 = \underline{258} \\ 40 \times 6 = 240 \quad 3 \times 6 = 18 \quad 240 + 18 = 258 \end{array}$$

• *Rounding and Compensating* - changing numbers to multiples of 10/100 and adjusting once multiplied

$$\begin{array}{l} 47 \times 9 = \underline{423} \\ 47 \times 10 = 470 \quad 470 - 47 = 423 \end{array}$$

• *Repeated Addition* - using a numberline, adding 1 group of a multiplier at a time

$$4 \times 6 = \underline{24}$$



- using a numberline, adding more than 1 group of the multiplier at a time

