



# Calculation Policy

Haresfield C of E Primary School



# How we teach it.

Written and mental calculation at Stage 4

# Written Addition at Stage 4

## Method:

### The Expanded Method of Addition.

Partitioning two numbers on top of each other allows numbers to be added easily. Children need to ensure that the Hundreds, Tens and Units are lined up correctly.

*Partition both numbers.*

$$\begin{array}{r} 123 = 100 + 20 + 3 \\ 45 = \phantom{100} + 40 + 5 \\ \hline 168 = 100 + 60 + 8 \end{array}$$

*Line up the H, T & U*

*Recombine to get the answer.*

*100+0    20+40    3+5*

## Leading to:

### Column Addition

In Year 4 Column Addition will be taught alongside the Expanded Method to encourage children to see how they relate.

$$\begin{array}{r} 123 = 100 + 20 + 3 \\ + 45 = \phantom{100} + 40 + 5 \\ \hline 168 = 100 + 60 + 8 \end{array}$$

*Is the same as:*

$$\begin{array}{r} \text{HTU} \\ 123 \\ + 45 \\ \hline 168 \end{array}$$

### Column Addition with carrying

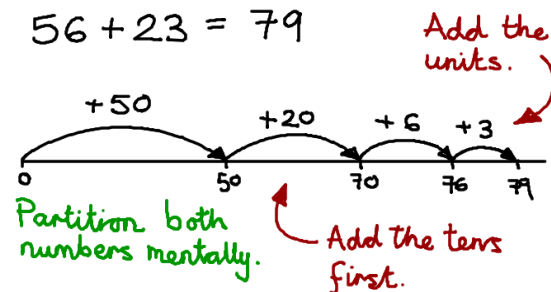
*Remember to line up the HTU.*

$$\begin{array}{r} \text{HTU} \\ 467 \\ + 215 \\ \hline 682 \\ \phantom{00}1 \end{array}$$

*Because 7+5=12 we have to carry the 10.*

## Strategies to support:

Written addition using a number line.



## Next Steps:

Adding **decimals** using Column Addition and the Expanded Method.

$$\begin{array}{r} \text{T} \quad \text{U} \quad \frac{1}{10} \\ 12.3 = 10 + 2 + 0.3 \\ + 6.5 = \phantom{10} + 6 + 0.5 \\ \hline 18.8 = 10 + 8 + 0.8 \end{array}$$

*Start adding from the right.*

$$\begin{array}{r} \text{TU} \cdot \frac{1}{10} \\ 12.3 \\ + 6.5 \\ \hline 18.8 \end{array}$$

## Mental Addition at Stage 4

### Children should be able to recall:

- Sums of pairs of multiples of 10, 100 or 1000.
- Pairs of fractions that total one.

- Addition doubles of numbers 1 to 100.  
E.g.  $38 + 38$

- What must be added to any three digit number to make the next multiple of 100.  
E.g.  $521 + ? = 600$

### Working mentally, children should be able to:

- Add any pair of two-digit numbers including crossing the 10 and 100 boundary.  
E.g.  $47 + 58$

- Add a near multiple of 10.  
E.g.  $56 + 29 = 56 + 30 - 1$
- Add near doubles of two-digit numbers.  
E.g.  $38 + 37$

- Add two-digit or three-digit multiples of 10  
E.g.  $120 + 140$

### Children should know when to:

- Count on in hundreds tens or ones.
- Partition: add tens and units separately then recombine.

- Partition: Add a multiple of 10 and adjust.  
E.g.  $56 + 29 = 56 + 30 - 1$
- Partition: Double and adjust.  
E.g.  $38 + 37 = 38 + 38 - 1$

- Use knowledge of place value and related calculations.  
E.g. Work out  $140 + 150$  using  $14 + 15 = 29$
- Partition: Count on in minutes and hours, bridging through 60.

# Written Subtraction at Stage 4

## Method:

### The Expanded Method of Subtraction.

Looking very similar to addition, the Expanded Method of Subtraction affords the ability to subtract large numbers.

Partition both numbers.

$$\begin{array}{r} 789 = 700 + 80 + 9 \\ - 65 = \phantom{700} + 60 + 5 \\ \hline \end{array}$$

Subtract the bottom number from the top.

$$724 = 700 + 20 + 4$$

Recombine to get the answer.

$$80 - 60 \quad 9 - 5$$

## Leading to:

### The Expanded Method of Subtraction with exchange.

Difficulties arise when the number on top has digits which are smaller than the number below. Exchanging using the expanded method leads directly into Column Subtraction.

$$\begin{array}{r} 263 = 200 + \cancel{60} + \cancel{3} \\ 46 = \phantom{200} + 40 + 6 \\ \hline \end{array}$$

We exchange 1 ten for 10 units.

$$217 = 200 + 10 + 7$$

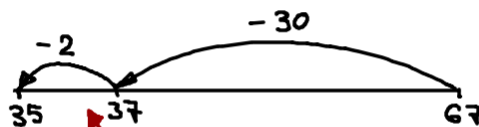
Recombine to get the answer.

$$50 - 40 \quad 13 - 6$$

## Strategies to support:

Partitioning the smaller number and counting back from the larger number using a number line to help.

$$67 - 32 = 35$$



Then the units.

Take away the tens.

## Next Steps:

Subtracting **decimals** using the Expanded Method.

$$\begin{array}{r} 12.3 = 10 + \cancel{2} + \cancel{0.3} \\ - 1.5 = \phantom{10} + 1 + 0.5 \\ \hline 10.8 = 10 + 0 + 0.8 \end{array}$$

Exchange with the next digit.

$$1.3 - 0.8$$

## Mental Subtraction at Stage 4

### Children should be able to recall:

- Differences of pairs of multiples of 10, 100 or 1000.

- Halves of numbers 1 to 100.  
E.g. Halve 56

- What must be added to any three digit number to make the next multiple of 100.  
E.g.  $521 + ? = 600$

### Working mentally, children should be able to:

- Subtract any pair of two-digit numbers including crossing the 10 and 100 boundary.  
E.g.  $91 - 35$

- Subtract a near multiple of 10.  
E.g.  $36 - 19 = 36 - 20 + 1$

- Subtract two-digit or three-digit multiples of 10  
E.g.  $370 - 180$

### Children should know when to:

- Count back in hundreds tens or ones.
- Subtract by counting up from the smaller number.

- Partition: subtract tens and units.  
E.g. Subtracting 27 by subtracting 20 then 7.
- Partition: Subtract a multiple of ten then adjust.

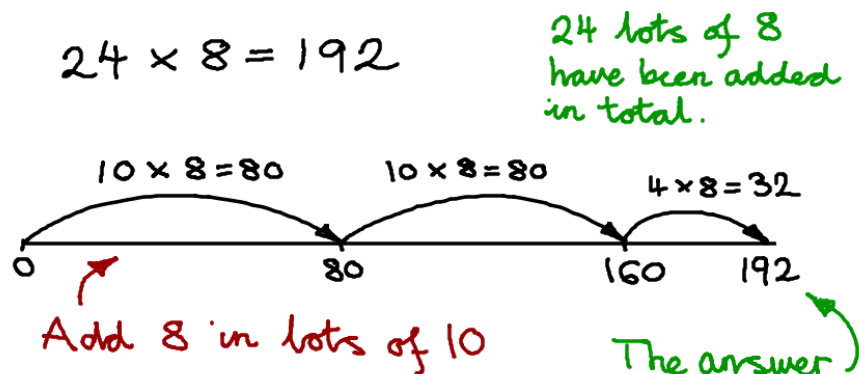
- Use knowledge of place value and related calculations.  
E.g.  $290 - 150$  using  $29 - 15 = 14$
- Partition: Count back in minutes and hours, bridging through 60.

# Written Multiplication at Stage 4

## Method:

### Repeated addition using times table facts.

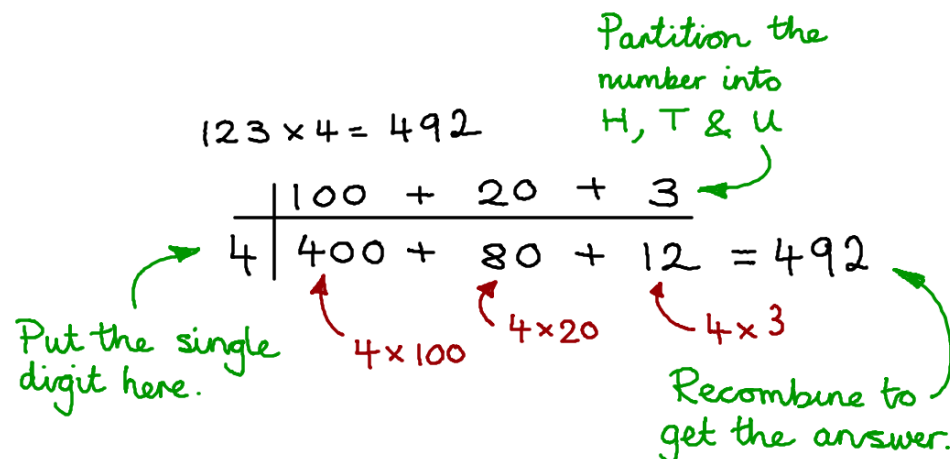
Using a number line and knowledge of multiplication of multiples of 10 allows efficient adding using a number line.



## Leading to:

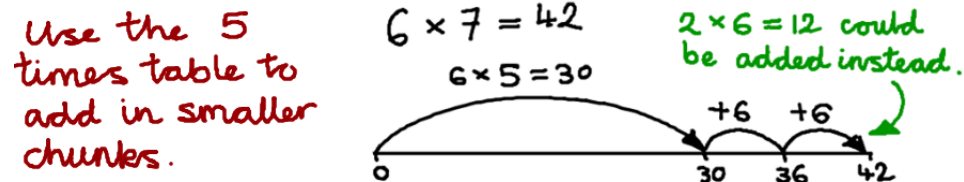
### The Grid Method of Multiplication.

Setting out the steps using a number line in a more formal way leads to the Grid Method of Multiplication.



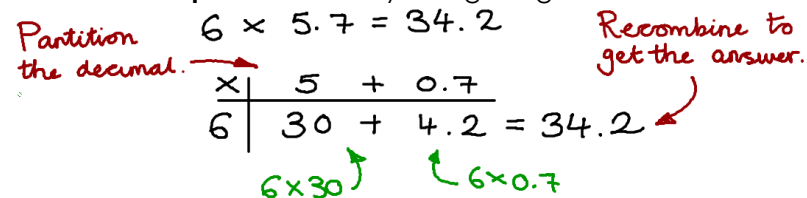
## Strategies to support:

Use lower times tables to add in smaller chunks.



## Next Steps:

Multiplication of **simple decimals** by a single digit.



## Mental Multiplication at Stage 4

### Children should be able to recall:

- Multiplication facts to  $10 \times 10$ .
- Doubles of numbers 1 to 100.  
E.g. Double 58.

- Doubles of multiples of 10 and 100.  
E.g. Double 50, Double 200.

- Factor pairs for known multiplication facts.

### Working mentally, children should be able to:

- Double any two-digit number.  
E.g. Double 39
- Double any multiple of 10 or 100.  
E.g. Double 340, Double 800.

- Multiply numbers to 1000 by 10 and then 100.
- Multiply a multiple of 10 by a single-digit number.  
E.g.  $40 \times 3$

- Multiply numbers to 20 by a single-digit number.  
E.g.  $17 \times 3$
- Give the factor pair associated with a multiplication fact.  
E.g. 6 has the factor pair 2 and 3

### Children should know when to:

- Partition: Double the tens and ones separately then recombine.

- Use understanding that when a number is multiplied by 10 or 100, its digits move one or two places to the left.
- Use knowledge of multiplication facts and place value.  
E.g.  $7 \times 8 = 56$ ,  $70 \times 8 = 560$

- Use partitioning and the distributive law to multiply.  
E.g.  $13 \times 4 = (10 \times 4) + (3 \times 4)$   
 $= 40 + 12$

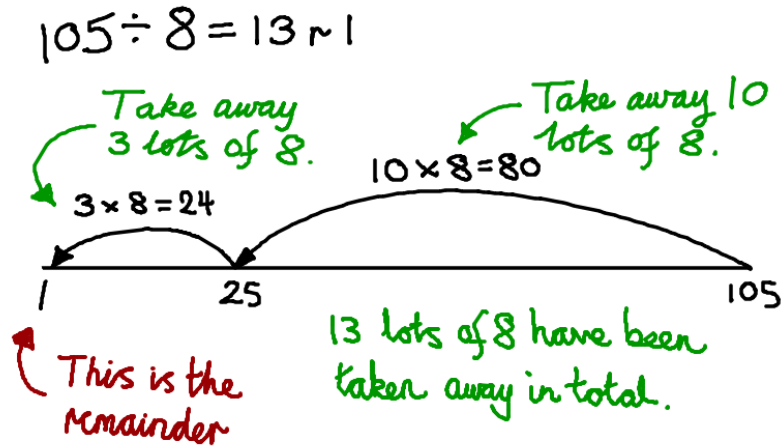


# Written Division at Stage 4

## Method:

### Repeated subtraction using times table facts.

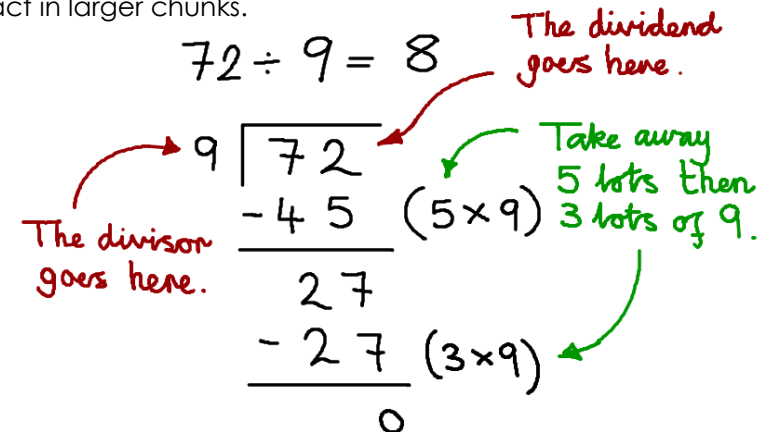
Using known times table facts allows children to subtract larger 'chunks' from the original number. Children will be performing division where there are remainders.



## Leading to:

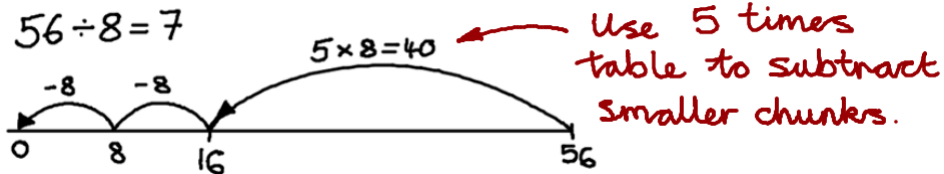
### Chunking using times table facts.

Once children are comfortable with division as repeated subtraction they can start to use more a more formal layout. When children are comfortable with the layout they can begin to use their ten times table to subtract in larger chunks.



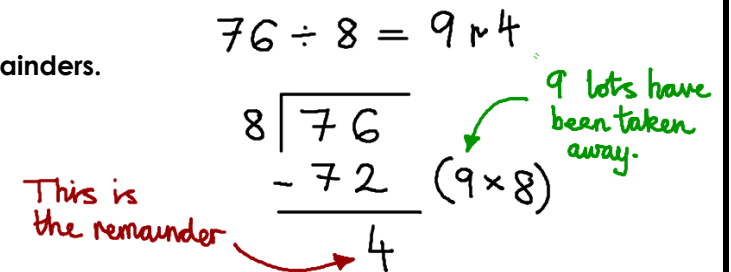
## Strategies to support:

Use lower times tables to subtract in smaller chunks.



## Next Steps:

Chunking with remainders.



## Mental Division at Stage 4

### Children should be able to recall:

- Corresponding division facts of times tables up to 10 x 10.
- Halves of numbers to 100.

- Halves of multiples of 10 and 100.

- Fraction and decimal equivalents of one-half, quarters, tenths and hundredths.  
E.g.  $\frac{3}{10}$  is 0.3 and  $\frac{3}{100}$  is 0.03

### Working mentally, children should be able to:

- Halve multiples of 10 and 100.
- Halve any even number to 200.

- Find unit fractions and simple non-unit fractions of numbers and quantities.  
E.g.  $\frac{3}{8}$  of 24

- Divide numbers to 1000 by 10 and then 100.  
E.g.  $600 \div 100$ ,  $850 \div 10$
- Identify the remainder when dividing by 2, 5 or 10.

### Children should know when to:

- Partition: halve the tens and units separately then recombine.

- Use understanding that when a number is divided by 10 or 100, its digits move one or two places to the right.

- Use knowledge of multiplication facts and place value.  
E.g.  $56 \div 7 = 8$ ,  $560 \div 70 = 8$