

Calculation Methods



WEST RISE

Year 4

About Our Calculation Policy

The following calculation policy has been written to meet requirements of the National Curriculum 2014 for the teaching and learning of mathematics, and is also designed to give pupils a consistent and smooth progression of learning in calculations across the school.

Year Group expectations:

The calculation policy is organized according to Year group expectations, as set out in the National Curriculum 2014, however it is vital that pupils are taught according to the stage that they are currently working at, being moved on to the next level as soon as they are ready or working at a lower stage until they are secure enough to move on.

Providing a context for calculation:

It is important that any type of calculation is given a real-life context or problem solving approach to help build children's understanding of the purpose of calculation, and to help them recognize when to use certain operations and methods when faced with problems. This will be a priority within calculation lessons.

Choosing a calculation method:

Children will be taught and encouraged to use the following processes in deciding which approach they will take to a calculation to ensure they select the most appropriate method for the numbers involved.

Key Skills for Year 4

- Locate 4 and 5 digit numbers on a landmarked line; use to compare and order numbers; round to nearest 10/100/1000
- Understand the numbers of 1s, 10s, 100s, 1000s + 10,000s in a 5-digit number and the use of zero as a place holder
- Know that one-place decimal numbers represent ones and tenths
- Count in steps of 2, 4, 5, 10, 50, 100 and 1000
- Recognise negative numbers in relation to number lines and temperature
- Add and subtract multiples of 1, 10, 100, 1000 without difficulty
- Mentally add and subtract any pair of 2-digit numbers
- Know how to use written addition: first expanded method, moving onto compact method
- Subtract 3-digit numbers from 3-digit numbers by counting up /back along a number line
- Use counting up/back to subtract from multiples of 1000 where difference is less than 500
- Multiply 1- and 2-digit numbers by 10, 100 and 1000
- Divide 1- and 2-digit numbers by 10 and 100 to understand place value in decimal numbers with one place
- Know and recite 2, 3, 4, 5, 9, 10 times tables including division facts up to 12th multiple; including multiplying by 0 or by 1
- Multiply 1-digit numbers by 2-digit or friendly 3-digit numbers using grid method
- Know how to use a written method for division above the range of the tables facts
- Write equivalent fraction for fractions with given denominators or numerators, e.g. $\frac{1}{2} = \frac{4}{8}$. Reduce a fraction to its simplest form, e.g. $\frac{6}{12} = \frac{1}{2}$
- Convert between units of measurement, e.g. cm to m, g to kg, ml to l, analogue to digital time
- Identify acute and obtuse angles, compare and order angles up to 180°
- Interpret and present discrete data using bar charts and pictograms

Key Vocabulary for Year 4

Addition

add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, tens, units, ones, partition, plus, addition, column, tens boundary, hundreds boundary, increase, carry, expanded, compact. **thousands, hundreds, digits, inverse**

Subtraction

take, take away, less, minus, subtract, leaves, distance between, how many more, how many less/fewer, how many left, how much less it ____? Difference, count on, partition, tens, units, ones, least, count back, count on, exchange, decrease, hundreds, value, digit, **inverse**

Multiplication

groups of, lots of, times, array, altogether, multiply, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, _____ times, once/twice/three times, partition, grid method, multiple, product, tens, unit, value, **inverse**

Division

share, share equally, one each, two each, group, equal groups of, lots of, arrays, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, **divisible by, factor**

Addition

$$\begin{array}{r} \text{H T U} \\ 456 \\ + 367 \end{array}$$

- Line the numbers up in the correct columns
- Add the **units** together
- Add the **tens** together
- Add the **hundreds** together
- Now find the total for each column.

Expanded Method

$$\begin{array}{r} \text{H T U} \\ 456 \\ + 367 \\ \hline 110 \\ 700 \\ 823 \end{array} \quad \begin{array}{l} (6 + 7) \\ (50 + 60) \\ (400 + 300) \end{array}$$

$$456 + 367 = 823$$

Addition

$$\begin{array}{r} \text{H T U} \\ 4 5 6 \\ + 3 6 7 \end{array}$$

- Line the numbers up in the correct columns
- Add the **units** together (carry any **tens** forward to the **tens** column)
- Add the **tens** together (carry any **hundreds** forward to the **hundreds** column)
- Add the **hundreds** together

Standard Method

$$\begin{array}{r} \text{HTU} \\ 456 \\ + 367 \\ \hline 823 \\ \hline 11 \\ \hline \hline \end{array}$$

$$456 + 367 = 823$$

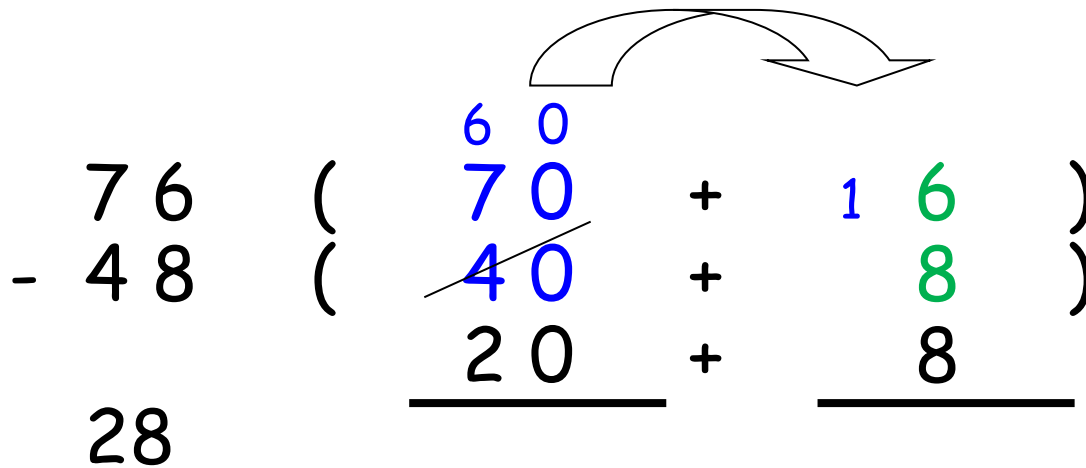
Subtraction

$$\begin{array}{cc} \text{T} & \text{U} & - & \text{T} & \text{U} \\ 7 & 6 & - & 4 & 8 \end{array}$$

$$76 - 48 = 28$$

Decomposition Method

- Line the numbers up in the correct columns
- **Partition** the larger number into **tens** and **units**
- **Partition** the smaller number into **tens** and **units**
- Subtract the **units**
- Subtract the **tens**
- Now add the answers together

$$\begin{array}{r} 76 \\ - 48 \\ \hline 28 \end{array} \quad \left(\begin{array}{r} 60 \\ 70 \\ 40 \\ 20 \end{array} + \begin{array}{r} 16 \\ 8 \end{array} \right) =$$


Exchange one ten from the **tens** column for ten ones in the **units** column

Subtraction

$$\begin{array}{r} \text{T} \text{ U} + \text{T} \text{ U} \\ 76 - 48 \end{array}$$

- Line the numbers up in the correct columns
- Subtract the **units**
- Exchange from the **tens** column
- Subtract the **tens**

Standard Method

$$\begin{array}{r} \text{T} \quad \text{U} \\ 6 \quad 1 \\ - 7 \quad 6 \\ \hline \text{4} \quad 8 \\ \hline 2 \quad 8 \end{array}$$

Exchange one ten from the **tens** column for ten ones in the **units** column

$$76 - 48 = 28$$

Multiplication

$$\begin{array}{l} \text{T U} \times \text{U} \\ 35 \times 6 \end{array}$$

- Draw out the grid
- **Partition** the TU number into **tens** and **units**.
- Place numbers in grid
- Multiply the numbers together
- Take the answers out of the grid to add up using any of the addition methods (cross out the numbers)

Grid Method

\times	30	5
6	180	30

$$\begin{array}{r} \text{HTU} \\ 180 \\ + \quad 30 \\ \hline 210 \\ \hline 1 \end{array}$$

$$35 \times 6 = 210$$

Multiplication

$$\begin{array}{r} \text{T U} \times \text{T U} \\ 74 \times 59 \end{array}$$

- Draw out the grid
- **Partition** the TU number into **tens** and **units**.
- Place numbers in grid
- Multiply the numbers together
- Take the answers out of the grid to add up using any of the addition methods (cross out the numbers)

Grid Method

x	70	4
50	3500	200
9	630	36

$$\begin{array}{r} \text{TH} \quad \text{H} \quad \text{T} \quad \text{U} \\ 3 \quad 5 \quad 0 \quad 0 \\ + \quad \quad 6 \quad 3 \quad 0 \\ \quad \quad 2 \quad 0 \quad 0 \\ \quad \quad \quad 3 \quad 6 \\ 4 \quad 3 \quad 6 \quad 6 \\ \hline 1 \end{array}$$

$$74 \times 59 = 4366$$

Multiplication

$$\begin{array}{r} \text{H T U} \\ 136 \end{array} \times \begin{array}{r} \text{H T U} \\ 7 \end{array}$$

- Multiply the **units** by the **multiplier** (carry any **tens** forward to the **tens** column)
- Multiply the **tens** by the **multiplier** (carry any **hundreds** forward to the **hundreds** column)
- Multiply the **hundreds** by the **multiplier**

Standard Method

$$\begin{array}{r} \text{HTU} \\ 136 \\ \times \quad 7 \\ \hline 952 \\ 24 \\ \hline \end{array}$$

$$136 \times 7 = 952$$

Division

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{U} \quad \quad \text{U} \\ 6 \quad 2 \quad 0 \quad \div \quad 5 \end{array}$$

- Draw out the bus stop
- Place in the numbers
- Divide the **hundreds** by the number you are dividing by. (Exchange remaining **tens**)
- Divide the **tens** by the number you are dividing by. (Exchange remaining **units**)
- Divide the units by the number you are dividing by

Short Method

$$\begin{array}{r} 1 \\ 5 \overline{) 6120} \end{array}$$

How many 5s in 600? 100
(This leaves 100 which is exchanged for ten **tens** in the **tens** column)

$$\begin{array}{r} 1 \quad 2 \\ 5 \overline{) 61220} \end{array}$$

120 divided by 5 = 20
(This leaves 20 which is exchanged for 20 **units** in the **units** column)

$$\begin{array}{r} 1 \quad 2 \quad 4 \\ 5 \overline{) 61220} \end{array}$$

20 divided by 5 = 4

$$620 \div 5 = 124$$