



Plains Farm Academy Calculation and Recording Policy

This policy contains the key recording methods that will be taught within our school. It has been written to ensure consistency and progression throughout the school.

Although the focus of the policy is on pencil and paper procedures it is important to recognise that the ability to calculate mentally lies at the heart of the mathematics. Mental recall and methods will be taught systematically from Reception onwards and pupils will be given regular opportunities to develop the necessary skills. However, mental calculation is not at the exclusion of written recording and should be seen as complementary to and not as separate from it. In every written method there is an element of mental processing. Sharing written methods with the teacher encourages children to think about the mental strategies that underpin them and to develop new ideas. Therefore written recording both helps children to clarify their thinking and supports and extends the development of more fluent and sophisticated mental strategies.

During their time at this school children will be encouraged to see mathematics as both a written and spoken language. Teachers will support and guide children through the following important stages:

- Use of practical equipment
- Developing the use of pictures and a mixture of words and symbols to represent numerical activities;
- Using standard symbols and conventions;
- Use of jottings to aid a mental strategy; and
- Use of pencil and paper procedures;

This policy concentrates on the introduction of standard symbols. It is important that children do not abandon practical equipment, jottings and mental methods once pencil and paper procedures are introduced. Therefore, children will always be encouraged to look at a calculation/problem and then decide which, is the best method to choose. Our long term aim is for children to be able to select an efficient method of their choice (whether this be mental or written) that is appropriate for a given task.



Subtraction

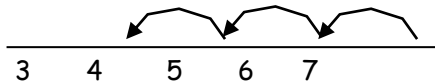
Year 1

Using - and = signs in calculations.

Using practical equipment to count sets of objects, 'take some away' and count how many are left to find the answer.

More able children to begin to count back on a complete number line.

$$7 - 3 = 4$$

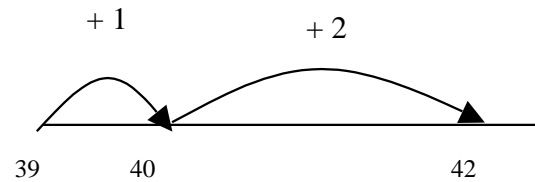


Year 2

Counting back on a complete number line moving on to counting on from smaller number on a blank number line.

Subtract 9 or 11 by subtracting 10 first.

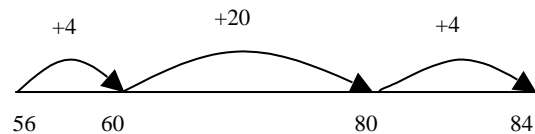
$$42 - 39 = 3$$



Counting on using larger numbers and 'chunking' jumps into larger numbers and multiples of ten on a blank number line.

Complementary addition

$$84 - 56 = 28$$



Year 3

Column subtraction (up to 3 digits)

874 - 523 becomes

$$\begin{array}{r} 874 \\ - 523 \\ \hline 351 \end{array}$$

Answer: 351

932 - 457 becomes

$$\begin{array}{r} 8 \quad 12 \quad 1 \\ 932 \\ - 457 \\ \hline 475 \end{array}$$

Answer: 475

Year 4

Column subtraction (up to 4 digits)

Year 5

Column subtraction (more than 4 digits)

Year 6

Fluent in all methods and apply to problem solving.

Addition

Year 1

Using + and = signs in calculations.

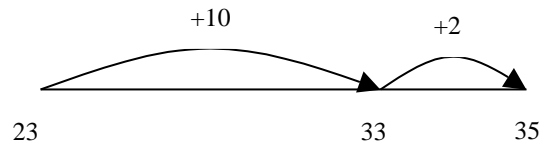
Using practical equipment to count two sets of objects, and then count altogether.

More able children to begin to count on using a marked number line.

Year 2

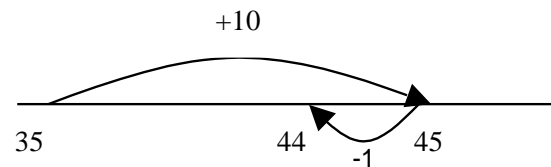
Develop number line methods adding tens then units.

$$23 + 12 = 35$$



Add 9 or 11 by adding 10 and adjusting by 1

$$35 + 9 = 44$$



Begin using expanded column addition, moving on to 3 digit numbers

$$83 + 42 = 125$$

$$\begin{array}{r} 83 \\ + 42 \\ \hline 120 \\ \hline 125 \end{array}$$

Year 3

Column addition with 'carrying' up to 3 digit numbers.

789 + 642 becomes

$$\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \\ \hline 11 \end{array}$$

Answer: 1431

Year 4

Column addition (up to 4 digits).

Extend to decimals in the context of money.

Year 5

Column addition (more than 4 digits).

Year 6

Fluent in all methods and apply to problem solving.

Division

Year 1

Using practical equipment; pictorial representations; arrays.

Year 2

Using \div and $=$ signs in calculations.

Practical sharing.

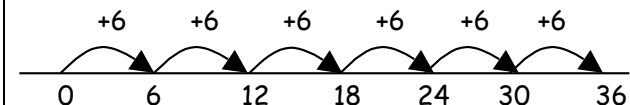
Using a blank number line to count 'groups'.



Year 3

Continued work counting 'groups' on a number line.

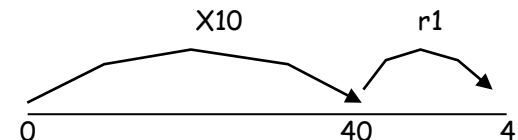
$$36 \div 6 = 6$$



Moving on to 'chunking' jumps and working with remainders.

Remainders

$$41 \div 4 = 10 \text{ r}1 \text{ (Put answer in at end)}$$



Year 4

Short division

$$98 \div 7 \text{ becomes}$$

$$\begin{array}{r} 14 \\ 7 \overline{) 98} \\ \underline{7} \\ 28 \\ \underline{28} \\ 0 \end{array}$$

Answer: 14

$$432 \div 5 \text{ becomes}$$

$$\begin{array}{r} 86 \text{ r}2 \\ 5 \overline{) 432} \\ \underline{40} \\ 32 \\ \underline{30} \\ 2 \end{array}$$

Answer: 86 remainder 2

Year 5

Short division (4-digit/1-digit)

Moving on to long division.

$$\begin{array}{r} 151 \text{ r}23 \\ 25 \overline{) 3798} \\ \underline{25} \\ 129 \\ \underline{125} \\ 48 \\ \underline{25} \\ 23 \end{array}$$

Year 6

Refine Year 5 methods (4-digit/2-digit).

$$432 \div 15 \text{ becomes}$$

$$\begin{array}{r} 28.8 \\ 15 \overline{) 432.0} \\ \underline{30} \\ 132 \\ \underline{120} \\ 120 \\ \underline{120} \\ 0 \end{array}$$

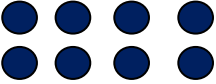



Multiplication

Year 1

Practical equipment; pictorial representations and arrays

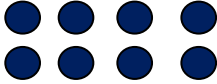

Arrays and repeated addition


4x2 or 4+4

2x4 or 2+2+2+2

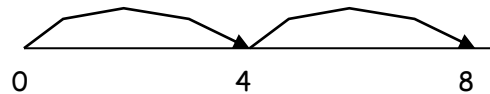
Year 2

x and = signs used in calculations and calculations with missing numbers.

Arrays and repeated addition


4x2 or 4+4

2x4 or 2+2+2+2

Using a number line



Year 3

x and = signs used in calculations and calculations with appropriate missing numbers.

Grid method for 1-digit x 2-digit, initially just 'teens'.

$2 \times 15 = 30$ (must record answer at the end of the calculation)

x	10	5
2	20	10

Moving on to 1-digit x 2-digit.

$3 \times 32 = 96$ (must record answer at the end of the calculation)

x	30	2
3	90	6

Year 4

Grid method for 2 and 3-digit x 1-digit, moving on to 2-digit x 2-digit.

$23 \times 13 = 299$ (must record answer at the end of the calculation)

x	10	3
20	200	60
3	30	9

Moving on to short multiplication; 2 digit and 3 digit by 1 digit

342×7 becomes

$$\begin{array}{r}
 342 \\
 \times 7 \\
 \hline
 2394 \\
 \hline
 \end{array}$$

Answer: 2394

Year 5

Long multiplication; 4-digit x 1-digit, moving on to 4-digit x 2-digit

124×26 becomes

$$\begin{array}{r}
 124 \\
 \times 26 \\
 \hline
 744 \\
 2480 \\
 \hline
 3224 \\
 \hline
 11
 \end{array}$$

Answer: 3224

Year 6

Fluent in all methods and apply to problem solving.

