

Calculation

Guide

This guide aims to outline strategies clearly and efficiently. If you would like any further advice or support please do not hesitate to contact your child's class teacher.

Rationale

Maths is part of everyday adult life and it is essential to develop the pupils' skills and understanding for the future. To support learning by identifying and explaining the key strategies for teaching calculation. There are three strategy stages: **practical, mental and written**. Written stages often have several steps. Stages are not specifically age or year group related as children develop at different rates and start from different points.

All children will be encouraged to use all three stages at a level appropriate to their development. There will be an emphasis on developing the practical and mental stages before introducing written methods. All four operations will be taught from Foundation stage up. From the early stages of learning we will ensure the links between the operations, specifically the use of the inverse, is made clear to learners.

Our key aim is for all children to be confident when calculating mentally. The emphasis in teaching will be on practical and mental. Written methods will support pupil's mental calculation when the quantity or size of the numbers is too great to manage mentally.

The strategies outlined are those we consider the most suitable and appropriate for the majority of children at Spofforth. These are the methods we will teach and model. They are the methods we would expect the majority of our learners to adopt.

We are fully aware that one single method will not always suit all and that some children will be comfortable with variations of these methods or on some occasions a different method. If calculating correctly and accurately we will not prevent a child using any method.

Addition

Practical –

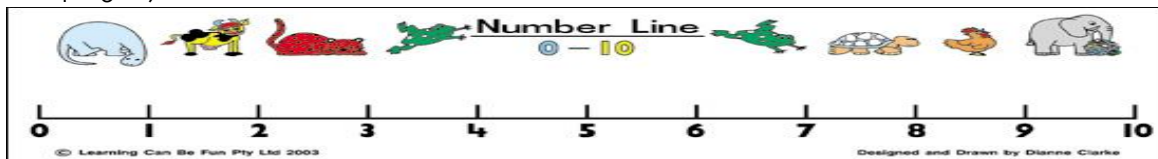
- Adding using equipment for example unifix cubes, counting bears and cuisenaire rods.
- Counting on using fingers.
- Counting on, on a number line or 100 square.

Mental- Sound and secure knowledge of

- Number bonds to 10, 100, 1000, 10,000 and 1.
- Counting in groups.
- Place value and partitioning e.g. $453 = 400 + 50 + 3$.

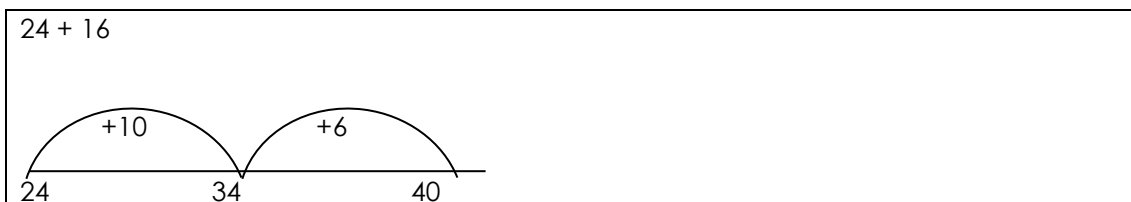
Written –

- A filled in number line.
- $4 + 5 = 9$



Starting from the largest number counting in 1's or groups to add the amount.

- An empty number line placing the largest number first and partitioning.



- Partitioning without a number line.
- $345 + 567 = 912$

$$\begin{array}{r} 300 + 500 = 800 \\ 40 + 60 = 100 \\ 5 + 7 = 12 \end{array}$$

Subtraction

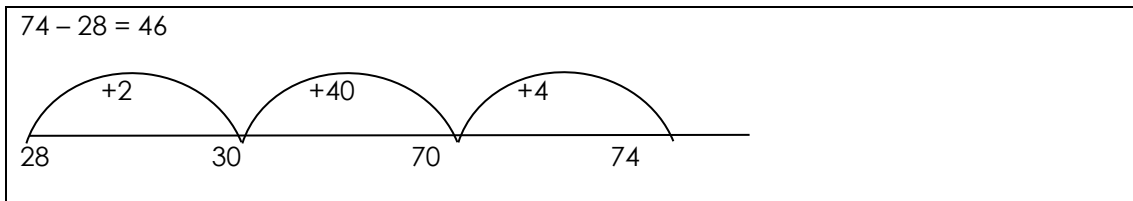
Practical – Taking away objects from a group, counting back on fingers, counting back on a number line or 100 square

Mental - Sound and secure knowledge of

- Counting back in singles
- Counting back in groups e.g. 2, 5, 10's
- Counting back in groups bridging into previous 10 or 100 e.g. 122, 112, 102, 92
- Knowledge of the inverse $5 + 6 = 11$ so $11 - 5 = 6$ and $11 - 6 = 5$

Written –

- Find the difference by counting up on a filled in number line
- Find the difference by counting on in steps on a number line



- Partitioning – Partition the amount being subtracted.

$345 - 281 = 64$ e.g. -200, then -80, then -1

$$345 - 200 = 145$$

$$145 - 80 = 65$$

$$65 - 1 = 64$$

Multiplication

Practical – Making groups using apparatus e.g. cubes, counters etc

Mental - Sound and secure knowledge of multiplication tables. Learning tables is a vital part of mathematical knowledge. Fun activities such as chanting tables whilst skipping or bouncing a ball all help to embed this.

Phase one – 2, 5, 10.

Phase two – 3, 4 & 6.

Phase three – 7, 8 and 9.

- Children should learn the inverse facts alongside multiplication facts e.g. $6 \times 7 = 42$ so $42 \div 7 = 6$ and $42 \div 6 = 7$
- Apply multiplication facts to multiples of 10 e.g. $3 \times 40 = 120$, then $20 \times 70 = 1400$ then $600 \times 40 = 24000$
- Apply multiplication facts to decimals e.g. $6 \times 0.5 = 3.0$ then $0.2 \times 0.3 = 0.06$

Written – Partitioning – multiplying any whole number or decimal by a single digit

U x TU e.g. $4 \times 16 = 64$

$$4 \times 10 = 40$$

$$4 \times 6 = 24$$

$$40 + 24 = 64$$

U x HTU e.g. $123 \times 7 = 861$

$$100 \times 7 = 700$$

$$20 \times 7 = 140$$

$$3 \times 7 = 21$$

$$700 + 140 + 21 = 861$$

Decimals

8×0.6 = change decimal to whole number by multiplying then change back e.g.

$$0.6 \times 10 = 6$$

$$8 \times 6 = 48$$

$$48 \div 10 = 4.8$$

Grid method – multiplying any two or more digit whole or decimal number by a two digit number. The same method can be extended to complete HTU x TU or U.T x U.T

TU x TU e.g. $26 \times 34 = 864$

	30	4
20	600	80
6	180	24
$600 + 180 + 80 + 24 = 864$		

Division

Practical – Sharing – taking groups of a given amount from a collection. For example here is a collection of 10 cubes. Can you put them into groups of 3. How many groups have been made? Are there any left over? If so how many?

Mental- Sound and secure knowledge of multiplication tables and inverse up to 10×10 .

Ability to apply tables knowledge and inverse to multiples of 10 e.g. $45 \div 5 = 9$

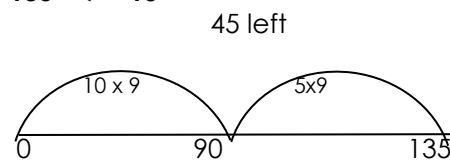
so $450 \div 5 = 90$

Ability to apply tables knowledge to decimals e.g. $18 \div 2 = 9$ so $1.8 \div 2 = 0.9$

Written – Using and applying multiplication tables knowledge. Working up in groups to the largest number using a number line.

Divide by a single digit – no remainder

$$135 \div 9 = 15$$



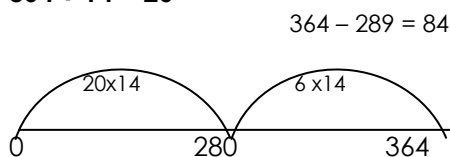
$$10 \text{ jumps} + 5 \text{ jumps} = 15$$

Key Facts

$10 \times 9 = 90$
Half 90 is 45 this is same as 5×9

Divide by a double digit – no remainder

$$364 \div 14 = 26$$



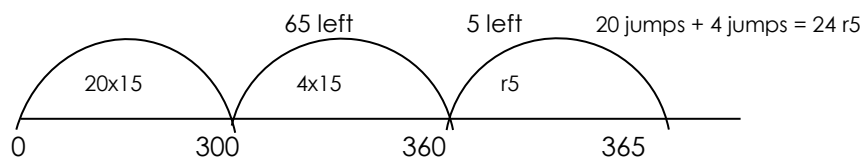
$$20 \text{ jumps} + 6 \text{ jumps} = 26$$

Key Facts

$10 \times 14 = 140$
Double 140 is 280 which is same as 20×14

Divide by a single or double digit with a remainder

$365 \div 15 = 24 \text{ r}5$ or $24 \frac{5}{15}$

Key Facts

$10 \times 15 = 150$

So

$20 \times 15 = 300$

Checking answers with a calculator is also important, as it is a skill we use in adult life.
They are used throughout the school.