

Written Calculation Policy
for
Acle St Edmund
Primary School



Help your child with maths

Year 3

Progression towards a standard written method of calculation

Introduction

This calculation policy has been written in line with the programmes of study taken from the revised **National Curriculum for Mathematics (2014)**. It provides guidance on the appropriate calculation methods and progression. The content is set out in Year blocks under the following headings: addition, subtraction, multiplication and division.

Alongside written calculations, mental calculation strategies will be taught in Maths lessons throughout the school. Pupils will be encouraged to use a range of mental strategies to solve number problems and will be equipped with the necessary recall skills to aid problem solving.

Pupils will be taught to use the most efficient methods for solving both mental and written calculations and to make the right choice, depending on the size and context of the numbers. Children will use mental methods as their first port of call, but for calculations that cannot be done in their heads; they will need to use an efficient written method accurately and with confidence.

Aims of the policy

- To ensure consistency and progression in our approach to calculation.
- To ensure that children develop an efficient, reliable, formal written method of calculation for all operations (addition, subtraction, multiplication and division).
- To ensure that children can use these methods accurately and fluently with confidence and understanding.

How to use this policy

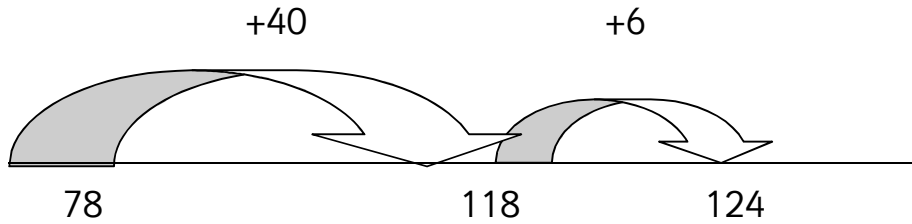
- Use the year group your child belongs to as a guide.
- Always use suitable resources to support your child's understanding of calculation e.g. number line/track, a 100 square, counting apparatus or encourage their use of recording their work by drawing their own number line, multiplication grid or recording their jottings.
- Use the language of place value when supporting your child. Try to use the same language as your child's class teacher (examples are included with each year group) and check their answers are sensible.
- Encourage your child to make suitable choices about the methods they use when solving problems.
- Support your child to develop quick recall of number facts as this is essential in your child's development of efficient and accurate problem-solving e.g. number bonds, doubles and halves and multiplication tables.

+ Addition +

Year 3

Children continue to use **empty number lines** with additions that bridge 100 and are encouraged to use more efficient jumps:

$$78 + 46 = 124$$



Children can continue to use a 200 number square to support counting on in tens and bridging 100.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Find 78 and count on forty. Begin on 78, add on the tens first. 88, 98. Now turn your 100 square over....

101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

Continue adding on the tens... 108, 118. Now count on 6. What number are you on now? 124.

Children are taught to further develop the **partitioning method**:

$$\begin{array}{c}
 85 + 37 = 122 \\
 \swarrow \quad | \quad \searrow \quad \swarrow \\
 80 \quad 5 \quad 30 \quad 7 \\
 \\
 80 + 30 = 110 \\
 5 + 7 = 12 \\
 110 + 12 = 122
 \end{array}$$

And are then introduced to the **expanded written method** with the addition presented first horizontally and then vertically in columns:

$$\begin{array}{l}
 63 + 32 = 95 \\
 60 + 3 \\
 \underline{30 + 2} \\
 90 + 5 = 95
 \end{array}
 \qquad
 \begin{array}{r}
 63 \\
 + \underline{32} \\
 5 \quad (3 + 2) \\
 \underline{90} \quad (60 + 30) \\
 95
 \end{array}$$

Children are taught to use the **expanded method** for additions where it is necessary to bridge, where you can see all the workings out:

$$\begin{array}{l}
 68 + 24 = 92 \\
 60 + 8 \\
 \underline{20 + 4} \\
 80 + 12 = 92
 \end{array}
 \qquad
 \begin{array}{l}
 \text{This leads to:} \\
 76 \\
 + \underline{47} \\
 13 \quad (7 + 6) \\
 \underline{110} \quad (70 + 40) \\
 \underline{123}
 \end{array}$$

Add the units first, then the tens.

If ready, the children can be introduced to the **formal written method** where it is necessary to 'carry' ten from the unit to the tens column. We use the language of **place value** (units, tens and hundreds) to ensure understanding.

$$\begin{array}{r}
 \text{TU} \\
 68 \\
 + \underline{24} \\
 \underline{92} \\
 1
 \end{array}$$

Add the units first. 8 add 4 equals 12. Write 2 in the units column and 'carry' 1(10) across into the tens column. 60 add 20 and the ten we 'carried' equals 90. Write 9 (90) in the tens column. The answer is 92.

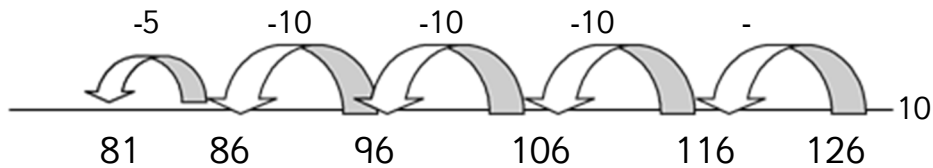
The digit that has been 'carried' should be recorded under the line in the correct column.

- Subtraction -

Year 3

Children continue to use marked number lines, 200 number squares and apparatus e.g. cubes, diennes, as necessary, and then blank number lines to work out subtractions that bridge 100:

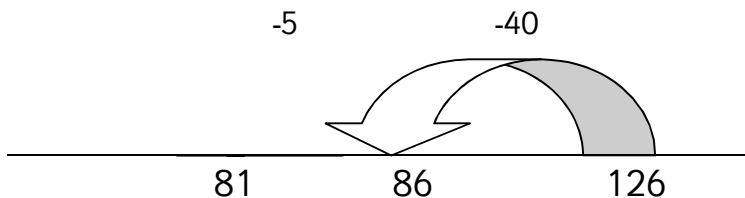
$$126 - 45 = 81$$



They continue to **partition** the smaller number ($45 = 40 + 5$) to count back from the bigger number

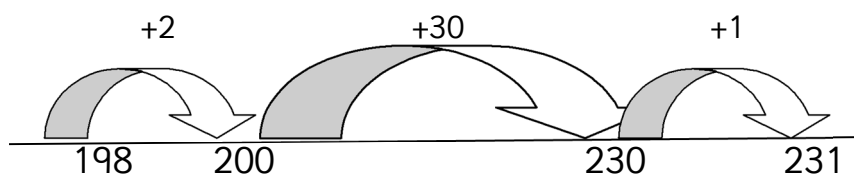
...and then progress to more efficient jumps:

$$126 - 45 = 81$$



Children continue to use a blank number line to **count on** when finding a small **difference**:

$$231 - 198 = 33$$



Children are encouraged to use their knowledge of number facts and place value to make efficient jumps.

Children are introduced to the **expanded written method** for subtraction with the calculation presented both horizontally and vertically (in columns) using 2-digit numbers.

$$78 - 23 = 55$$

$$\begin{array}{r} 70 + 8 \\ - 20 + 3 \\ \hline 50 + 5 = 55 \end{array}$$

Partition the numbers into tens and ones/units. Subtract the ones and then subtract the tens. Recombine to give the answer.

This leads into the **formal written method**. It is important to continue to use the language of place value (tens and units):

$$\begin{array}{r} \text{TU} \\ 78 \\ - 23 \\ \hline 55 \end{array}$$

Eight subtract three, seventy subtract twenty.

When **exchange/decomposition** is needed, and the children are secure, the children are introduced to the **expanded written method**:

e.g. $73 - 27 = 46$

$$\begin{array}{r} 70 + 3 \\ - 20 + 7 \\ \hline \end{array} \quad \text{becomes} \quad \begin{array}{r} 60 + 13 \\ - 20 + 7 \\ \hline 40 + 6 = 46 \end{array}$$

Partition the 73 into 60 + 13 in order to calculate 73 - 27.

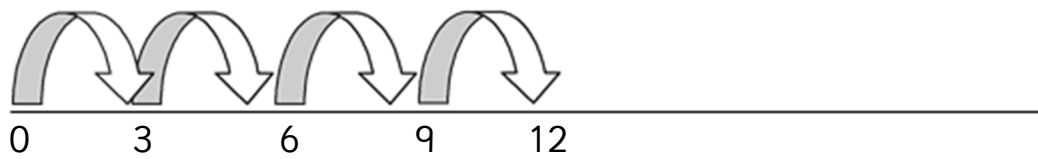
X Multiplication X

Year 3

Children continue to use **arrays** and **empty number lines** to support their understanding of multiplication. Children are expected to continue learning 3x, 4x and 8x tables which can then be applied in their problem solving.

$$4 \times 3 = 12$$

$$1 \times 3 \quad 2 \times 3 \quad 3 \times 3 \quad 4 \times 3$$



Children are introduced to the **partitioning method** for multiplication of 2-digit numbers by a 1-digit number:

$$\begin{array}{l} 13 \times 5 = 65 \\ \swarrow \quad \searrow \\ 10 \quad 3 \\ 10 \times 5 = 50 \\ 3 \times 5 = 15 \\ 50 + 15 = 65 \end{array}$$

Partition 13 into 10 + 3 and use the times tables you know to work out the total.

Children are then introduced to the **grid method**:

$$13 \times 8 = 104$$

X	10	3
8	80	24

Partition 13 into 10 + 3 and then multiply each number by 8. Add the **partial products** (80 and 24) together.

$$80 + 24 = 104$$

÷ Division ÷

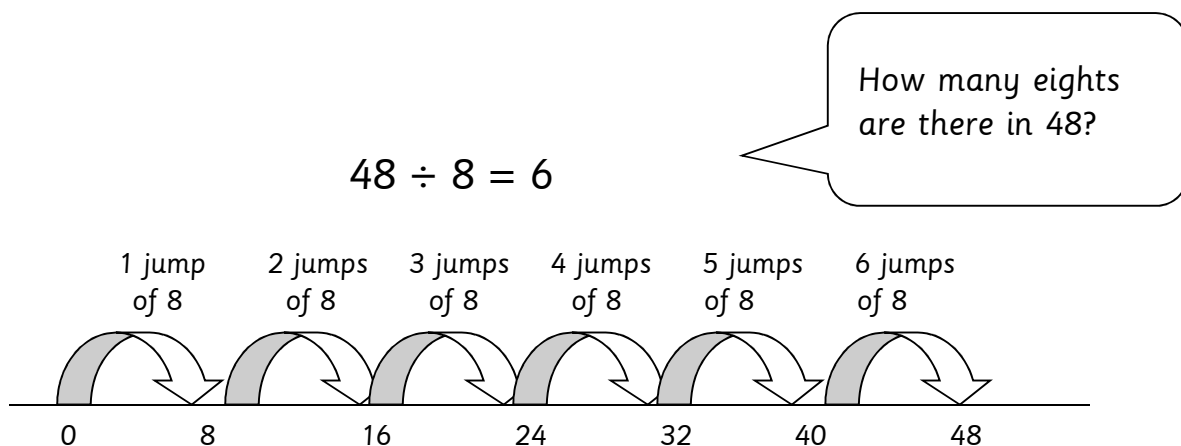
Year 3

Children learn and use multiplication and division facts for the 3x, 4x and 8x table (and continue to learn and practise 2x, 5x and 10x tables) and apply them in their problem solving.

They use the division (\div) symbol to record their work and write and calculate mathematical statements for division using the multiplication tables that they know, including 2-digit numbers divided by 1-digit numbers.

They may continue to use practical resources, pictures, diagrams, **number lines** and **arrays** in their problem solving.

And then move onto using an **empty number line** to count forwards.....



And make the link with **repeated subtraction**:

