

# Drayton Infant School Calculation Policy

November 2011

This policy outlines what we do at Drayton Infant School to teach calculation. We support and extend children as needed, broadening, deepening and applying their calculation knowledge.

## Vocabulary:

Mathematical vocabulary builds as the children progress through the school. The relevant vocabulary for each year group is listed in the National Strategies framework.

## Recording:

All the time we are encouraging mental calculation as that ability to calculate "in your head" is an important part of mathematics. As calculations become more complex written methods become more important. Recording in mathematics, and in calculation in particular, is an important tool both for furthering the understanding of ideas and for communicating those ideas to others. A useful written method is one that helps children carry out a calculation and can be understood by others. Written methods are complimentary to mental methods and should not be seen as separate from them. As a long term aim children should be able to choose an efficient method; mental, written, calculator- that is appropriate to a given task.

Children will always be encouraged to look at a calculation/problem and then decide on the best method.

**Progression in calculation is a developmental skill that should be taught when the child is ready.** Some methods may be taught alongside each other at the same stage of their mathematical development. Children's advancement in calculation should be at an appropriate time for their ability, which may not meet national expectations for their age. There is an expectation that children will eventually be able to apply their calculation skills to problem solving.

## Addition Methods

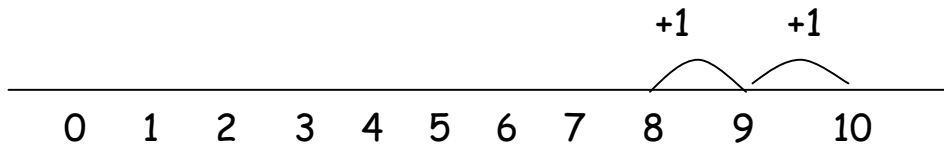
- To count and add together sets of real objects and pictures.

$$3+2 = 5$$



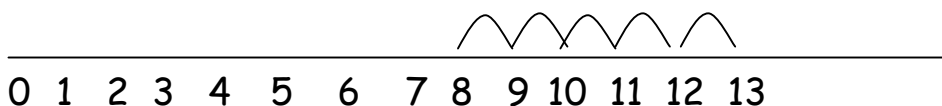
- To add one or several more onto a number line.

$$8+2 = 10$$



- To be able to add through 10, some children bridging through 10.

$$8+5 = 13$$



- To know that addition can be done in any order.  
Use knowledge by starting with biggest number.

$$\begin{aligned} 3+9 &= 9+3 \\ &= 12 \end{aligned}$$

$$\begin{aligned} 3+7+2 &= 7+3+2 \\ &= 10+2 \\ &= 12 \end{aligned}$$

- To be able to add 10 to any number up to 100.

$$\begin{aligned}6+10 &= 10+6 \\ &= 16\end{aligned}$$

- When adding 2 digit numbers use 100 square, find number and move down column vertically. Eventually this will be done mentally.

$$34+10 = 44$$

2	3	4	5	6
12	13	14	15	16
22	23	24	25	26
32	33	34	35	36
42	43	44	45	46
52	53	54	55	56

- To be able to add multiples of 10 to any number up to 100. When adding 2 digit numbers use 100 square, find number and move down column vertically. Eventually this will be done mentally.

$$34+40 = 74$$

22	23	24	25	26
32	33	34	35	36
42	43	44	45	46
52	53	54	55	56
62	63	64	65	66
72	73	74	75	76

- To be able to add 11 or 21 to a 2 digit number up to 100. Add 10 and then 1 or 20 then 1 to a 2 digit number. First use 100 square by moving down vertically and across horizontally.

$$45+11 = 56$$

24	25	26	27	28
34	35	36	37	38
44	45	46	47	48
54	55	56	57	58
64	65	66	67	68

$$\begin{aligned} 45+11 &= 45+10+1 \\ &= 55+1 \\ &= 56 \end{aligned}$$

$$\begin{aligned} 45+21 &= 45+20+1 \\ &= 65+1 \\ &= 66 \end{aligned}$$

- To be able to add 9 or 19 to a 2 digit number by adding 10 or 20 and subtracting 1. Use a 100 square by moving down vertically then horizontally. Eventually this will be done mentally.

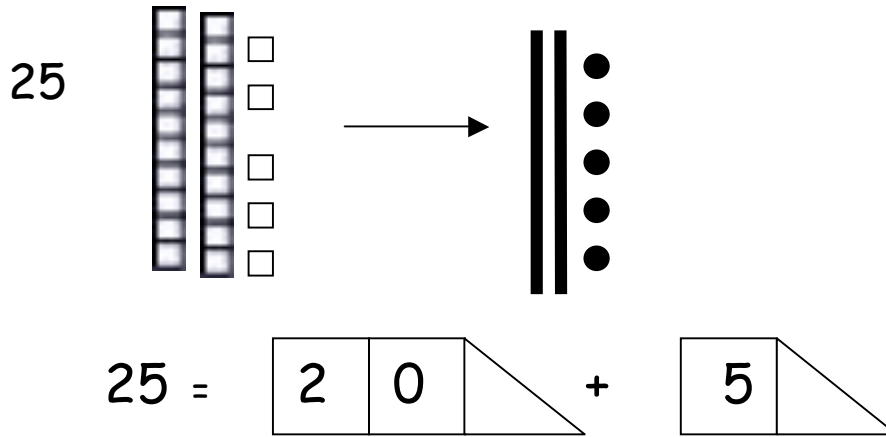
$$23+9 = 32$$

21	22	23	24	25
31	32	33	34	35
41	42	43	44	45
51	52	53	54	55
61	62	63	64	65

$$\begin{aligned} 23+9 &= 23+10-1 \\ &= 33-1 \\ &= 32 \end{aligned}$$

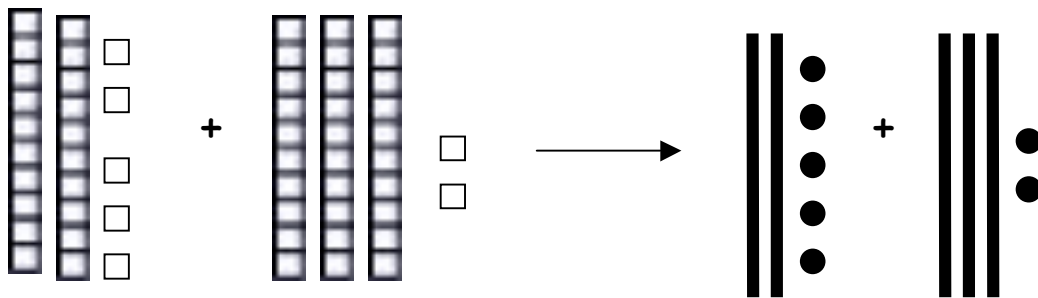
$$\begin{aligned} 23+19 &= 23+20-1 \\ &= 43-1 \\ &= 42 \end{aligned}$$

- To be able to partition 2-digit numbers by practical partitioning into tens and ones/units using Base 10 equipment, or drawings to represent, and arrow cards.



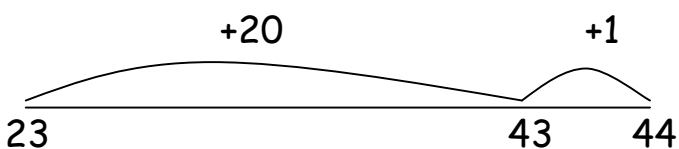
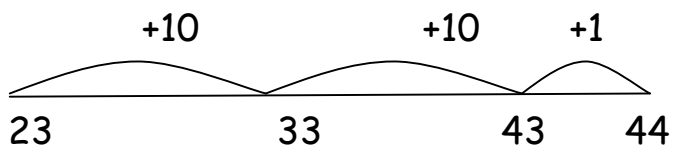
- To be able to add two 2-digit numbers by practical partitioning into tens and ones/units, using Base 10 equipment or drawings to represent.

$$25 + 32 = 57$$



- To be able to add two 2-digit numbers on an empty number line.

$$23 + 21 = 44$$



- To be able to add two 2-digit numbers by partitioning

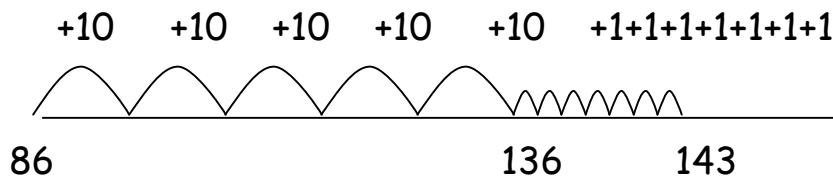
$$\begin{array}{l}
 23+41 = 20+3+40+1 \\
 = 40+20+3+1 \\
 = 60+4 \\
 = 64
 \end{array}
 \quad \text{or} \quad
 \begin{array}{l}
 23 + 41 \\
 20+40 = 60 \\
 3 + 1 = 4 \\
 = 64
 \end{array}$$

- To be able to add 3 two digit numbers by partitioning.

$$\begin{array}{l}
 23+21+34 = 20+20+30+3+1+4 \text{ or} \\
 = 70+8 \\
 = 78
 \end{array}
 \quad \begin{array}{l}
 20+20+30 = 70 \\
 3 + 1 + 4 = 8 \\
 70+8=78
 \end{array}$$

- To be able to add two 2-digit numbers over 100 on an empty number line

$$86+57 = 143$$



$$86+57 = 143$$



- Partitioning

$$\begin{array}{l}
 80+6+50+7 = 130+13 = 143 \quad \text{or} \\
 80+50 = 130 \\
 6+7 = 13 \\
 130+13=143
 \end{array}$$

# Subtraction Methods

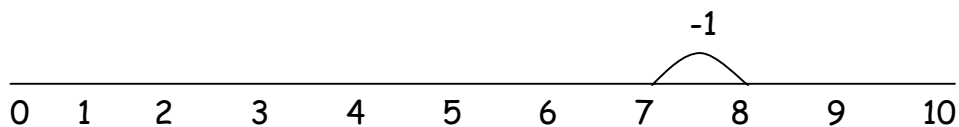
- To be able to take away real objects.

$$5 - 2 = 3$$



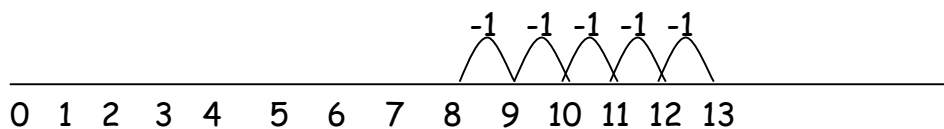
- To be able to subtract/take away one less on a number line.

$$8 - 1 = 7$$



- To be able to subtract through 10, some children bridging through 10.

$$13 - 5 = 8$$



- To be able to subtract 10 from any number up to 100. When subtracting 10 from 2-digit numbers using a 100 square, find number and move up column vertically. Eventually this will be done mentally.

$$34 - 10 = 24$$

2	3	4	5	6
12	13	14	15	16
22	23	24	25	26
32	33	34	35	36
42	43	44	45	46
52	53	54	55	56

- To be able to subtract multiples of 10 from any number up to 100. When subtracting 2-digit numbers using a 100 square, find number and move up column vertically. Eventually this will be done mentally.

$$84 - 40 = 44$$

32	33	34	35	36
42	43	44	45	46
52	53	54	55	56
62	63	64	65	66
72	73	74	75	76
82	83	84	85	86

- To be able to subtract 11 or 21 to a 2 digit number up to 100. First subtract 10 and then 1, or 20 then 1 from a 2-digit number. Use a 100 square by moving up vertically and across horizontally.

$$45-11 = 34$$

23	24	25	26	27
33	34	35	36	37
43	44	45	46	47
53	54	55	56	57

$$\begin{aligned} 45-11 &= 45-10-1 \\ &= 35-1 \\ &= 34 \end{aligned}$$

$$\begin{aligned} 45-21 &= 45-20-1 \\ &= 25-1 \\ &= 24 \end{aligned}$$

- To be able to subtract 9 or 19 from a 2-digit number by subtracting 10 or 20 and adding 1. Use a 100 square by moving up vertically then horizontally. Eventually this will be done mentally.

$$43-9 = 34$$

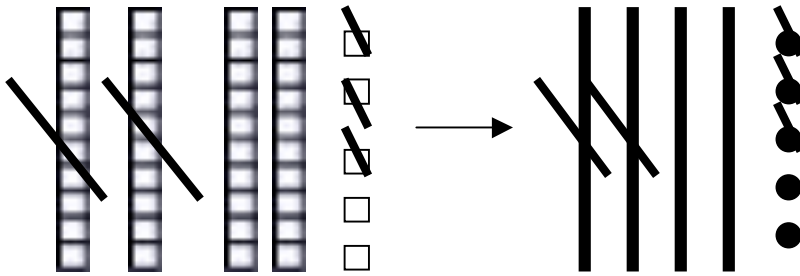
11	12	13	14	15
21	22	23	24	25
31	32	33	34	35
41	42	43	44	45
51	52	53	54	55
61	62	63	64	65

$$\begin{aligned} 43-9 &= 33-10+1 \\ &= 33+1 \\ &= 34 \end{aligned}$$

$$\begin{aligned} 63-19 &= 63-20+1 \\ &= 43+1 \\ &= 44 \end{aligned}$$

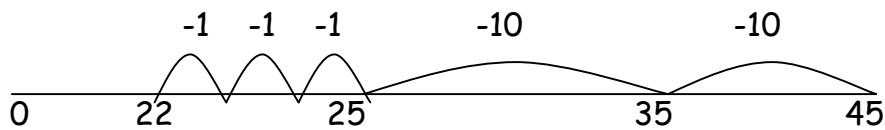
- To be able to subtract two 2-digit numbers by practical partitioning into tens and ones/units, using Base 10 equipment or drawings to represent.

$$45 - 23 = 22$$



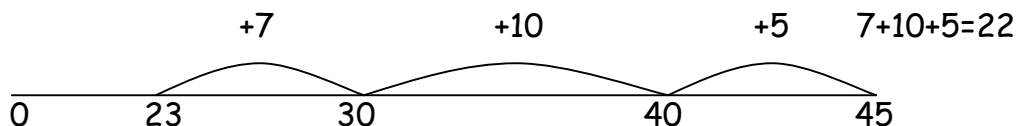
- To be able to subtract two 2-digit numbers by counting back on an empty number line.

$$45 - 23 = 22$$



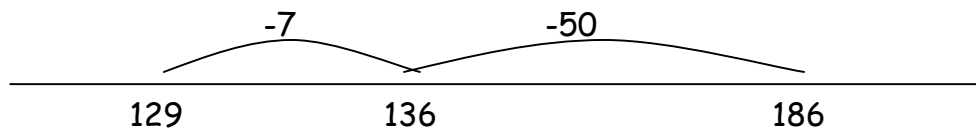
- To be able to subtract two 2-digit numbers by finding the difference through counting up on an empty number line.

$$45 - 23 = 22$$



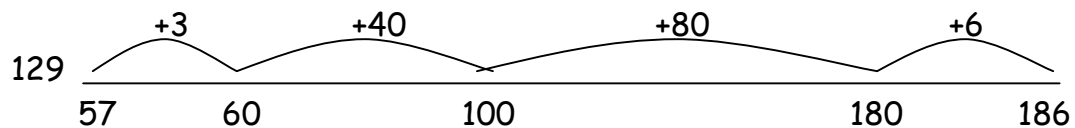
- To be able to subtract two 2-digit numbers over 100 by counting back on an empty number line.

$$186 - 57 = 129$$



- To be able to subtract two 2-digit numbers over 100 by finding the difference through counting up on an empty number line.

$$186 - 57 = 129$$



$$40 + 80 = 120$$

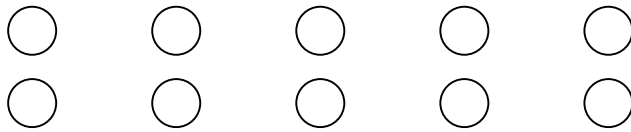
$$3 + 6 = 9$$

$$120 + 9 = 129$$

## Multiplication Methods

- To be able to practically count repeated groups/sets of the same size.
- To count mentally in 2s, 5s and 10s.
- To use objects to work out repeated addition.

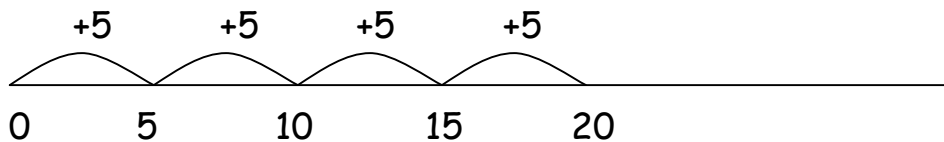
$$2 + 2 + 2 + 2 + 2 = 10$$



- To relate repeated addition to multiplication.

$$5 + 5 + 5 + 5 = 20$$

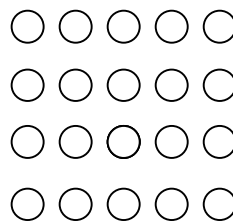
$$4 \times 5 = 20$$



- To multiply using arrays.

$$4 \times 5 = 20$$

$$5 \times 4 = 20$$

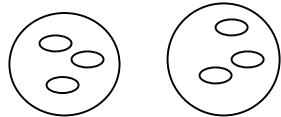


- To count mentally in 3s and 4s.
- To learn some multiplication facts by heart.

## Division Methods

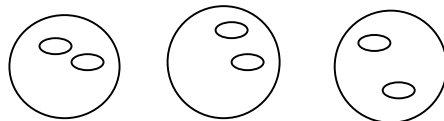
- To be able to half numbers to 1-20-practically and eventually mentally.
- To be able to divide practically by sharing.

6 eggs shared between 2 nests = 3



- To be able to divide practically by grouping.

6 eggs put into groups of 2 = 3



- To relate sharing and grouping to division symbol.

$$\begin{aligned} 6 \text{ eggs put into groups of } 2 &= 3 \\ 6 \div 2 &= 3 \end{aligned}$$

- To relate division to multiplication using arrays.

$$4 \times 5 = 20$$



$$5 \times 4 = 20$$



$$24 \div 6 = 4$$



$$24 \div 4 = 6$$

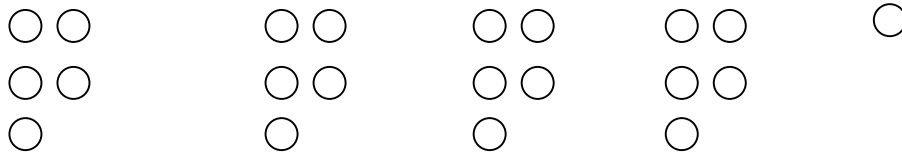


- To be able to divide with remainders practically by sharing and grouping.

Sharing:

$$21 \div 4 = 5r1$$

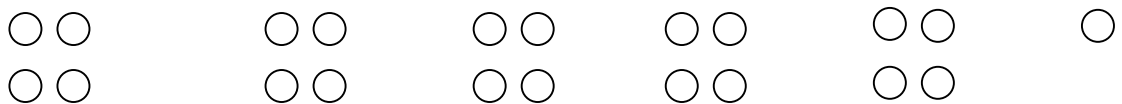
Share counters into 4 equal groups then count how many left over.



Grouping:

$$21 \div 4 = 5r1$$

Put counters into groups of 4 then count how many left over.



- To be able to divide on a number line with no remainders.

$$21 \div 3 = 7 \quad (\text{counting in groups of } 3)$$

