Fleet Infant School Calculation Policy

Aims

- To standardise the methods of calculation taught.
- To clarify these calculation methods.
- To show a clear progression from EYFS to Year 2.
- To establish a progression that will naturally lead in to Year 3.

This policy outlines what we do at Fleet Infant School to teach calculation. We support and extend children's learning as appropriate, broadening, deepening and applying their calculation knowledge.

This policy contains steps for the operations of addition, subtraction, multiplication and division and has been written to ensure consistency and progression throughout the school and reflects a whole school agreement.

It acknowledges the importance of both written and mental calculation strategies which will be taught systematically from Reception onwards. Pupils will be given regular opportunities to develop calculation skills for problem solving, mental fluency and reasoning.

Practical activities are seen as essential to the development of the mathematical concepts needed for calculation.

Mental calculation is not at the exclusion of written recording and should be seen as complementary to and not separate from it.

In every written method there is an element of mental processing which will become more fluent through good teaching of calculation methods.

Sharing written methods with the teacher and other children encourages children to reason and think about the mental strategies that underpin them. It also helps to make connections and develop new ideas. (Fluency)

Written recording 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:

* developing the use of concrete apparatus, pictures and a mixture of words and symbols to represent numerical activities;

* using standard symbols and conventions;

* using jottings to aid a mental strategy;

* using pencil and paper procedures.

Vocabulary:

Mathematical vocabulary builds as the children progress through the school. The relevant vocabulary for each year group is shared at the start of teaching a domain in maths and is listed in the National Strategies framework.

Recording:

We encourage mental calculation, the ability to calculate "in your head", as an essential part of mathematics. As calculations become more complex written methods and sound mental calculation 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 or written, that is appropriate to a given task.

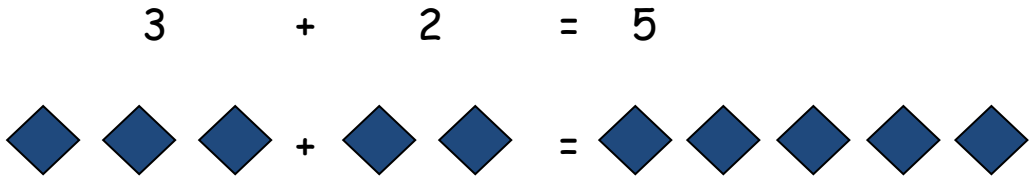
Progression in calculation is a developmental skill that should be taught when the child is ready.

Some methods may be taught alongside each other at the same stage of the child's mathematical development.

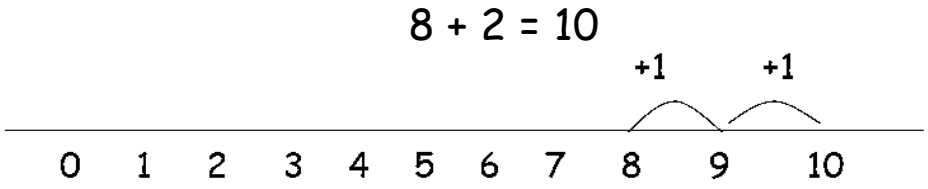
Children's advancement in calculation should be at an appropriate time for their ability, which may not meet national expectations for their age.
It is an expectation that children will be able to apply their calculation skills to problem solving.

Addition Methods

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

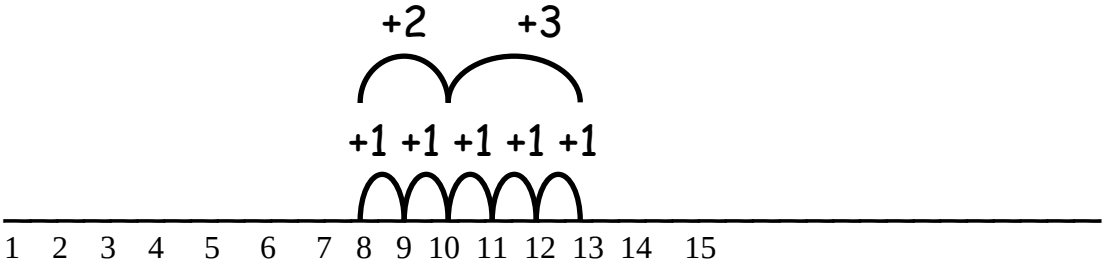


- To add one or several more onto a number line.



- To be able to add through 10. It is expected that children will bridge through 10 as they become more fluent with their pairs of numbers to 10.

8+5 = 13



- To know that addition can be done in any order.

Use knowledge by starting with the biggest number.

3 + 9 = 9 + 3
= 12

3 + 7 + 2 = 7 + 3 + 2
= 10 + 2
= 12

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

6 + 10 = 10 + 6
= 16

24 + 10 = 10 + 24
= 34

- 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 to 2-digit numbers use a 100 square, find the number and move down the 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 a 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
74	75	76	77	78

45 + 11 = 45 + 10 + 1 = 55 + 1 = 56

45 + 21 = 45 + 20 + 1 = 65 + 1 = 66

- 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

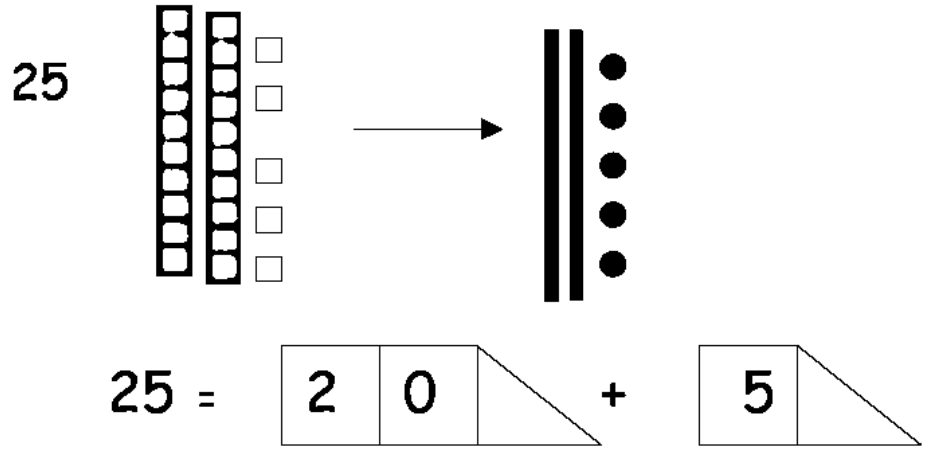
$$23 + 9 = 23 + 10 - 1 = 33 - 1 = 32$$

$$23 + 19 = 23 + 20 - 1 = 43 - 1 = 42$$

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

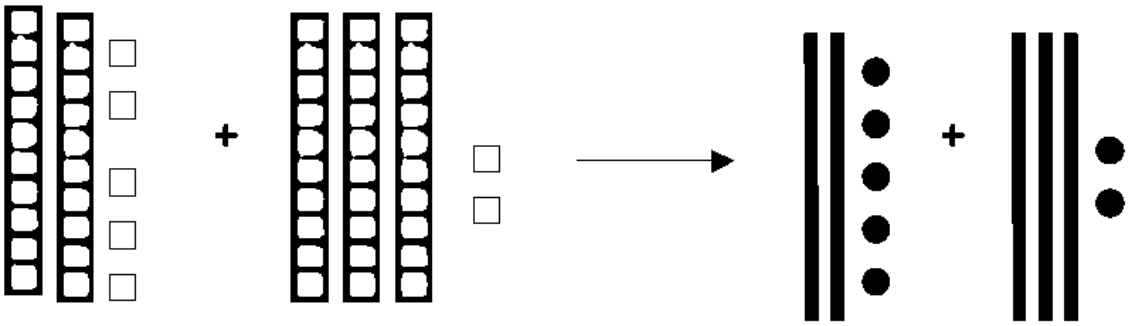
25

$$25 = 20 + 5$$



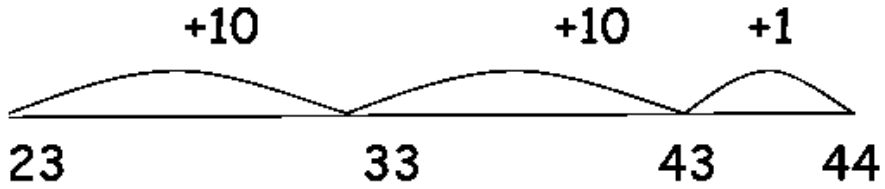
- To be able to add two 2-digit numbers by practically partitioning into tens and ones (units), using Base 10 equipment or drawings to represent numbers.

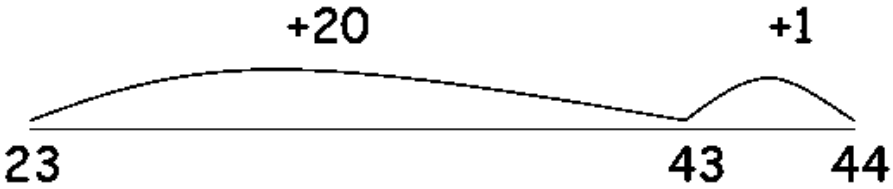
$$25 + 32 = 57$$



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

23 + 21 = 44





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

$$23 + 41 = 20 + 3 + 40 + 1$$

$$20 + 40 = 60 \text{ and } 3 + 1 = 4$$

$$= 60 + 4$$

$$= 64$$

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

$$23 + 21 + 34 = 20 + 20 + 30 + 3 + 1 + 4$$

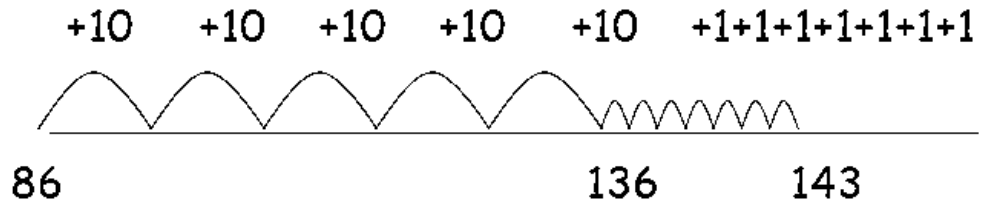
$$20 + 20 + 30 = 70$$

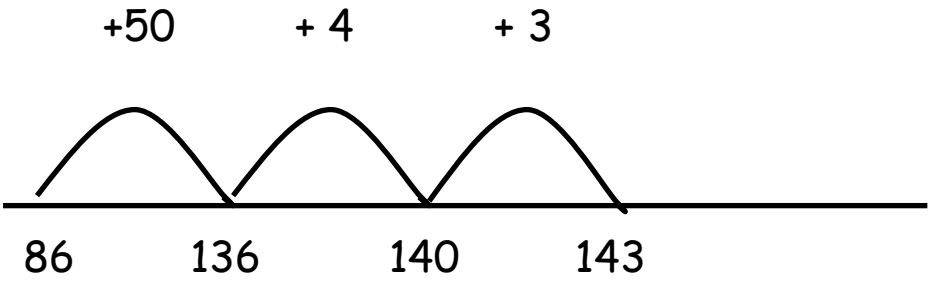
$$3 + 1 + 4 = 8$$

$$70 + 8 = 78$$

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

$$86 + 57 = 143$$





- Partitioning

80 + 6 + 50 + 7 = 130 + 13 = 143

or 80 + 50 = 130

and 6 + 7 = 13

130 + 13 = 143

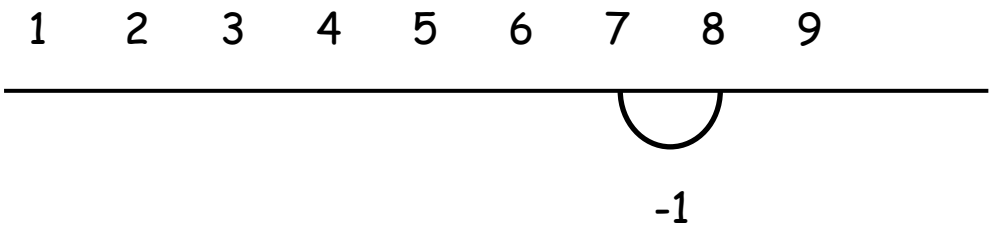
Subtraction Methods

- To be able to take away real objects.

5 - 2 = 3

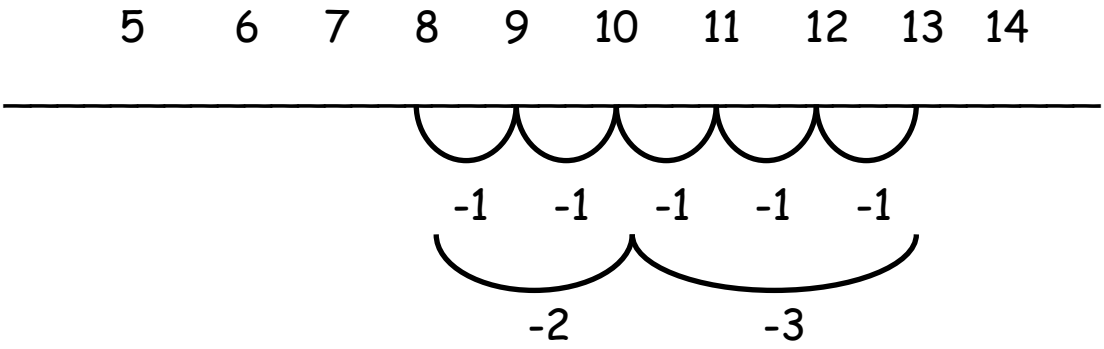
- To be able to subtract/take away one less on a number line.

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 the number and move up the 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 from 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 then 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

45 - 11 = 45 - 10 - 1
= 35 - 1
= 34

45 - 21 = 45 - 20 - 1
= 25 - 1
= 24

- 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

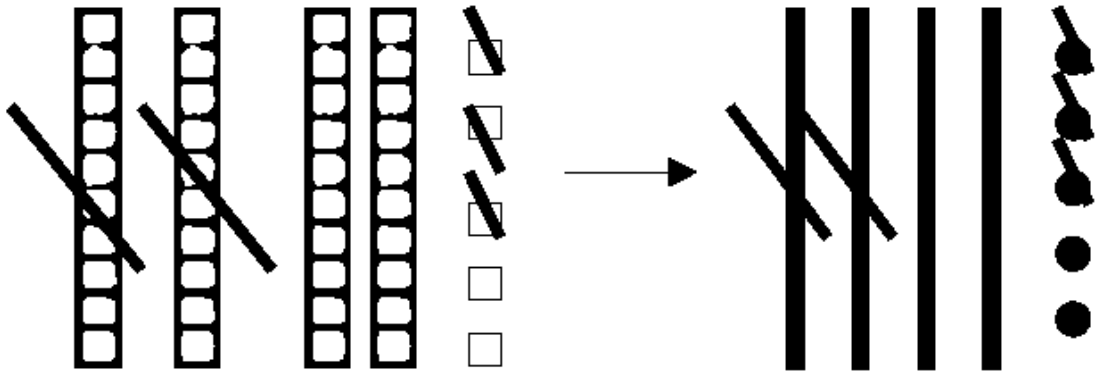
11	12	13	14	15
21	22	23	24	25
31	32	33	34	35
41	42	43	44	45
51	52	53	54	55
61	62	63	64	65

43 - 9 = 33 - 10 + 1
= 33 + 1
= 34

63 - 19 = 63 - 20 + 1
= 43 + 1
= 44

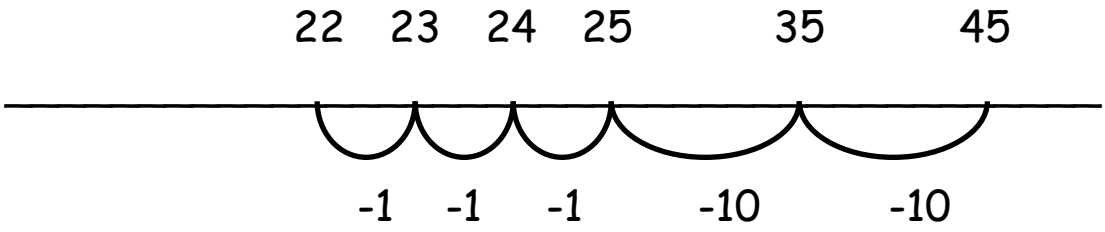
- To be able to subtract two 2-digit numbers by practical partitioning into tens and ones (units), using Base 10 equipment or drawings to represent numbers.

45 - 23 = 22



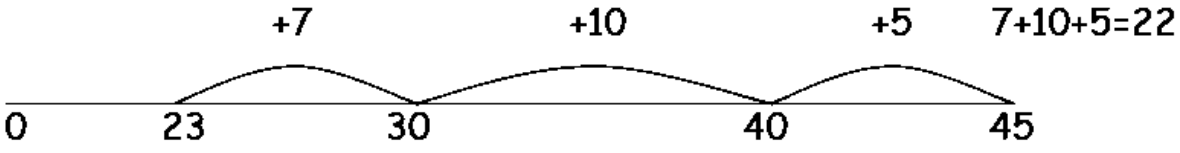
- To be able to subtract two 2 digit numbers by counting back on an unstructured number line.

45 - 23 = 22



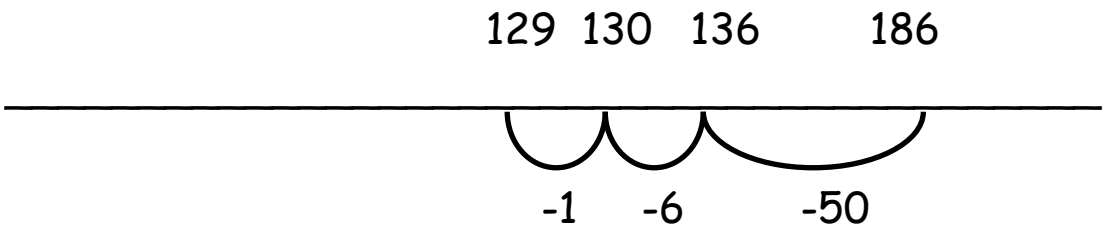
- To be able to subtract two 2-digit numbers by finding the difference through counting up on an unstructured number line.

45 - 23 = 22



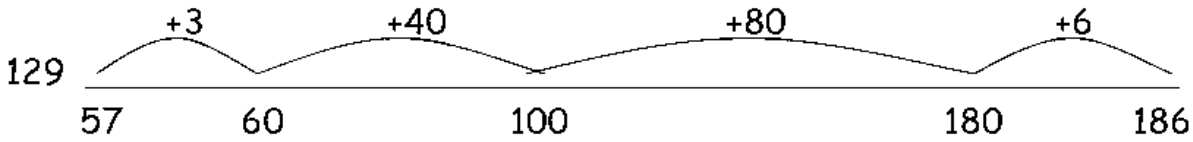
- To be able to subtract a 2-digit number from a number over 100 by counting back on an unstructured number line.

186 – 57 = 129



- To be able to subtract a 2-digit number from a number over 100 by finding the difference through counting up on an unstructured number line.

186 - 57 = 129



40 + 80 = 120
3 + 6 = 9
120 + 9 = 129

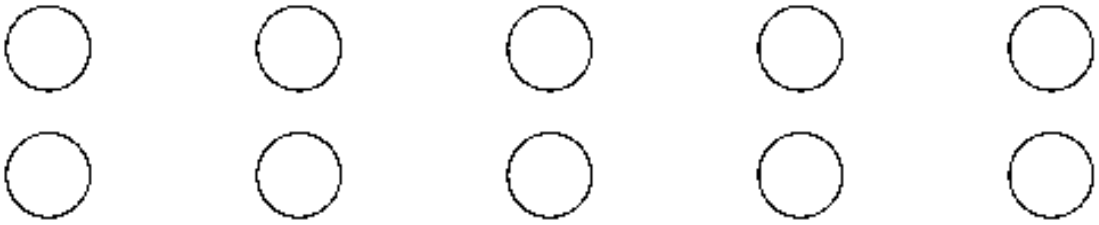
Multiplication Methods

- To be able to count repeated groups/sets of the same size.

- To count mentally in 2s, 5s and 10s.

- To use objects to work out repeated addition.

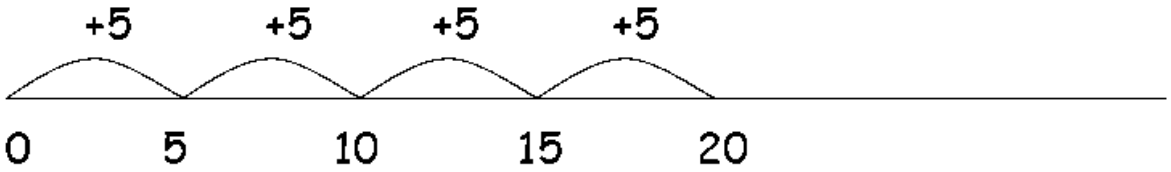
2 + 2 + 2 + 2 + 2 = 10



- To relate repeated addition to multiplication.

5 + 5 + 5 + 5 = 20

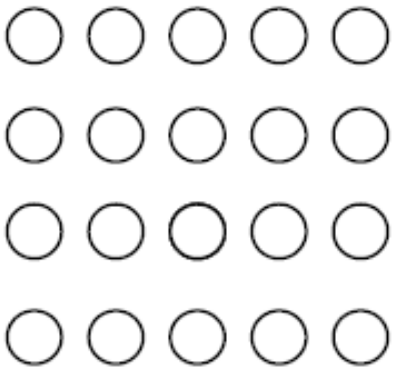
4 x 5 = 20



- To multiply using arrays.

4 x 5 = 20

5 x 4 = 20



- To count mentally in 3s.

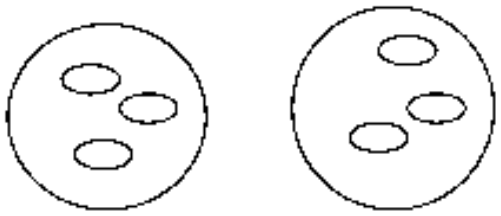
- To learn some multiplication facts by heart.

Division Methods

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

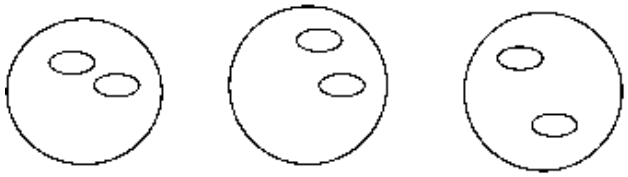
- To be able to divide by sharing practically.

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 the division symbol.

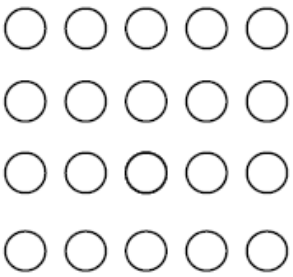
6 eggs put into groups of 2 = 3

6 ÷ 2 = 3

- To relate division to multiplication using arrays.

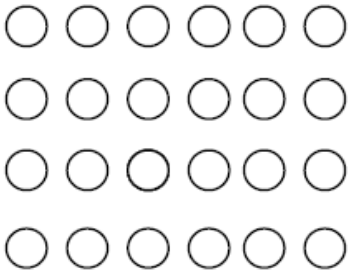
4 x 5 = 20

5 x 4 = 20



24 ÷ 6 = 4

24 ÷ 4 = 6

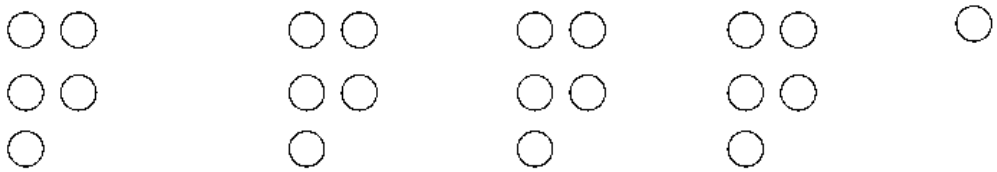


- To be able to divide with remainders practically by sharing and grouping.

Sharing:

21 ÷ 4 = 5 r 1

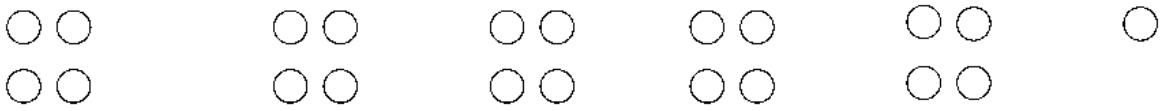
Share counters into 4 equal groups then count how many are left over.



Grouping:

$$21 \div 4 = 5 \text{ r } 1$$

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



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

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