Progression In Calculations at Lyndhurst Infant School

LYNDHURST INFANT SCHOOL

Multiplication and Division

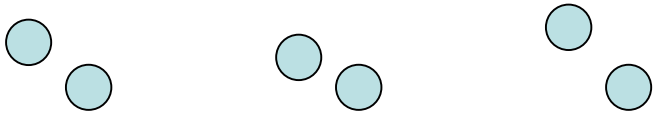
Mathematical Calculations in School Today.

This document is designed to help you to understand the calculation methods your child will be taught in school. When supporting your child at home with Maths work it would be helpful if you could reinforce these methods rather than teach them the way that you were taught. Please speak to you child's teacher to find out which methods would currently be the most appropriate for your child to practice at home.

Remember each child will progress at their own pace.

Understand Counting in Different Size Steps

Children could count out small sets of repeated groups of the same size using sweets, pencils, counters etc.



3 lots of 2 makes 6

Counting in different sized steps can be done in a range of contexts to make children familiar with the patterns in the numbers… count in 10's as you go up the stairs…. Count in 2's as you sort out the shoes/socks…. How many fingers are in the room? Count the hands of the people in the room in 5's.. Etc.

Count from 0 up to 20 and back.
Count in 2's and 10's from 0.
Begin to know doubles up to double 5.

Key Question/Vocabulary

Double, add, add on, lots of, groups of

Once, twice, three times…..

How many groups are there?

How many items are in each group?

Explanation.

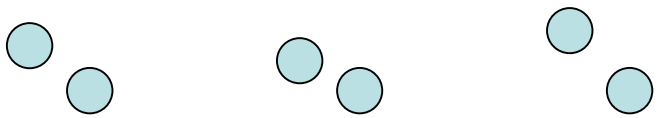
Children need to make the link between counting in different sized steps and the concrete experience of what that looks like. They need to experience physically counting repeated groups of the same size. This is best done in a 'real-life' context, eg counting piles of sweets, buttons or toys.

Progression

- Explore counting in 10's up to 100 and link to sets of objects
- Move on to counting in 2's, initially to 10 then on to 20 and link to sets of objects
- Progress to counting in 5's up to 50, linked to sets of objects

Understand Multiplication as Repeated Addition

Children could count out repeated groups of the same size as before, using sweets, pencils, counters etc. This time relate the vocabulary of addition to the vocabulary of multiplication.



2 add 2 add 2 makes 6

2 + 2 + 2 = 6

3 lots of 2 makes 6

2 x 3 = 6 (read as '2 three times')

Using Numicon to show 2 x 3 for eg, get out three 2 shapes and then use them to cover the 6 shape to show it is the same.

Count from 0 up to 20 and back. Count in 2's, 5's and 10's from 0. Begin to know doubles up to double 5 and link counting in 2's to doubling.

Continue counting in steps of 2's, 5's and 10's regularly. Then ask your child questions such as 'What is 2 x 6?', helping them to understand that if they count 6 times in 2's they will reach the answer.

Key Question/Vocabulary

Add, addition, repeated addition,

Times, multiply, multiplied by, lots of, groups of

How many equal groups are there?

How many items are in each group?

Explanation.

Children need to experience physically counting repeated groups of the same size. This is best done in a 'real-life' context, eg counting piles of sweets, buttons or toys

Progression

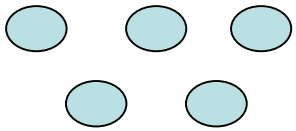
- Explore counting in 10's up to 100 and link to sets of objects
- Move on to counting in 2's, initially to 10 then on to 20 and link to sets of objects
- Progress to counting in 5's up to 50, linked to sets of objects

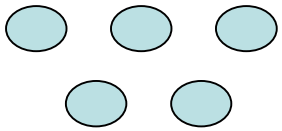
Understanding Division as Sharing

Share 10 sweets between 2 friends.

One for you, one for me, one for you….

Until all shared out equally. Count both piles to ensure that they are equal.





Use Numicon to explore how many shapes cover another larger one. Eg, how many 2 shapes cover an 8 plate?

Count in 2's, 5's and 10's from 0.
Begin to know doubles up to double 5 and link to halving.
Know the multiplication and division facts for the 10 times table.

Key Questions/Vocabulary

Share, share equally, share between

Share fairly, halve

How many each?

How many in each group?

Explanation

Children need to experience sharing a set of objects **equally** between people or teddies, initially between 2. It is important that they realise that things must be shared equally so ensure that they have a multiple of 2 to begin sharing with.

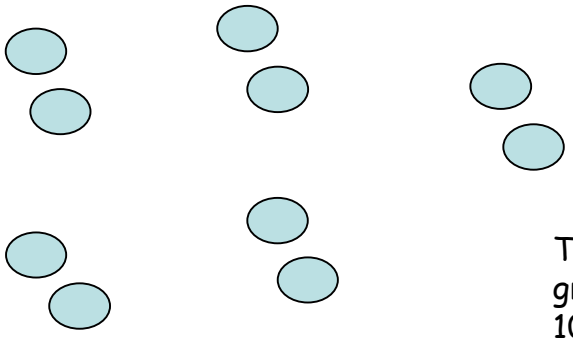
Progression

- Begin by sharing even numbers up to 10, then 20, equally between 2 and linking to the vocabulary of half
- Progress to sharing multiples of 10 between 10
- Progress to sharing multiples of 5 between 5

Understanding Division as Grouping

10 ÷ 2 = ? How many 2's are in 10?

Repeatedly take away groups of 2 from a set of 10 and counting how many equal piles of 2 there are.



There are 5 equal groups of 2 in 10
10 ÷ 2 = 5

Encourage children to read divisions as 'How many in?' (EG. 10 ÷ 2 is How many 2's in 10?) In this way children are able to begin to apply their times table knowledge by seeing how many times they count in 2's to reach 10.

Count in 2's, 5's and 10's from 0.
Know doubles up to double 5 and link to halving
Know the multiplication and division facts for the 10 times table.

Key Questions/Vocabulary

Share, share equally, share between, groups of

Divide

How many each?

How many groups?

Explanation

Children need to experience dividing a set of objects by grouping them equally or repeatedly taking away groups of equal size.

Progression

- Begin by dividing even numbers up to 10, then 20, by taking away equal groups of 2
- Progress to dividing multiples of 10 between 10 by taking away equal groups of 10
- Progress to dividing multiples of 5 between 5 by taking away equal groups of 5

Recognising Patterns in Numbers.

By counting on in twos and colouring in the numbers it is clear to see the pattern created. This helps children to understand odd and even numbers and recognise what multiples of 2 end with.

This activity can be done with any times table and allows children to see patterns in the times tables which may help them to learn them. (Eg, recognising that multiples of 10 end in 0, that multiples of 5 end in 0 or 5 etc)

Count in 2's, 5's and 10's from 0. Count in 10's from any number forwards and backwards

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

Key Questions/Vocabulary

Count on in twos, fives, tens…
Add, plus, more than, count on
Digits, pattern, sequence
Multiples of…
What is the same about the numbers coloured?
If we continue the pattern, will….. be coloured in? How do you know?

Explanation

Working with a hundred square helps develop a child's understanding of the number system. Looking at the patterns in numbers created by colouring in steps of the same size can help a child to predict which number will or won't be a multiple of a number.

Progression

- Begin by looking at the patterns created by the 2 and 10 times tables and use to make predictions
- Count on and back in tens from any given number, noting the patterns in the sequence created
- Progress to looking at the 5 times table and use to make predictions

Multiplication on a Number Line

Multiplication can be understood as a series of additions on a number line. It is important to start at 0 and ensure that each jump is the same size.

4 lots of 2 is 8

2 + 2 + 2 + 2 = 8

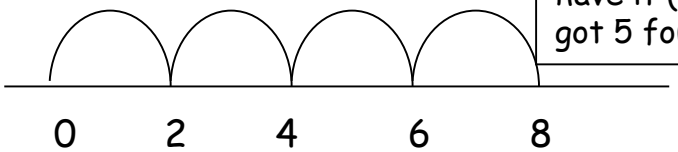
2 x 4 = 8 (read as '2 four times')

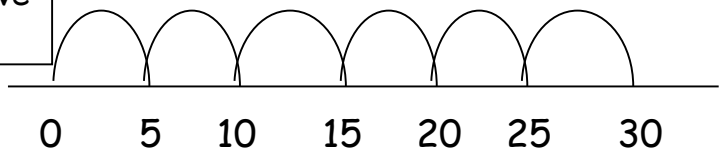
Encourage children to look at multiplications as 'What have I got and how many times have I got it?' So the first number relates to what you have and the second number indicates how many times you have it (5 x 4 would be you've got 5 four times)

6 lots of 5 is 30

5 + 5 + 5 + 5 + 5 + 5 = 30

5 x 6 = 30 (read as '5 six times')





Count in 2's, 5's and 10's from 0.
Know x and related ÷ facts for the 2 and 10 times tables

Key Questions/Vocabulary

Lots of, groups of, times, multiplied by

Repeated addition

Eg 2 x 4... What have you got? (2)

How many times have you got it? (4)

Explanation

Blank number lines can be used to enable children to count in jumps of repeated sizes. Children are taught to draw their own blank number lines, enabling them to do calculations within any range of numbers, although initially they learn the 2, 5 and 10 times tables. Children should begin to understand that multiplication is commutative (2 x 3 = 3 x 2)

Progression

- Begin with a small number of jumps within the child's counting range of 2's and 10's
- Progress to multiplying by 5 within their counting range

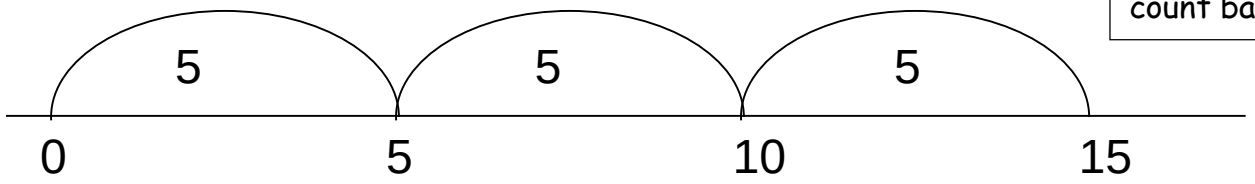
Division on a Number Line

Division can be understood on a number line. It is important to remember that the answer will be found by counting how many jumps were needed to reach the target number.

15 ÷ 5 = 3 (read as How many 5's are in 15?')

3 groups of 5 were jumped from 0 to reach 15.

It is easier to count on than count back, so by getting children to read division calculations as 'How many... in...?' they can link their times tables to division. In this way they are able to apply their knowledge of inverse operations. This enables them to solve divisions by counting on instead of having to repeatedly subtract and count back.



Count in 2's, 5's and 10's from 0. Know x and related ÷ facts for the 2 and 10 times tables

Key Questions/Vocabulary

Share, share equally, share between

Divide, division, grouping

How many ..... in ...?

Inverse

Explanation

Blank number lines can be used to enable children to count in jumps of repeated sizes. Children are taught to draw their own blank number lines, enabling them to do calculations within any range of numbers.

Progression

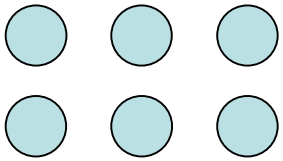
- Begin with ÷ 2 and 10, with no remainders
- Progress to ÷ 5 with no remainders

Multiplication as an Array

2 three times = 6

2 + 2 + 2 = 6

2 x 3 = 6



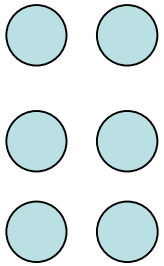
Look for arrays in the environment. ... Egg boxes, window panes, some trays of apples or bars of chocolate.

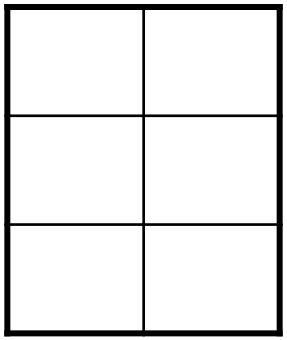
An array can be made up of any shape or item. Try creating arrays using sweets or other items.

3 two times = 6

3 + 3 = 6

3 x 2 = 6





Know x and related ÷ facts for the 2 and 10 times tables and begin to know the 5 times table

Key Questions/Vocabulary

Lots of, groups of, times, multiplied by, multiplication, Equals, commutative
Array, grid, representation
What have you got?
How many times have you got it?

Explanation

The arrangement of images clearly represents the number sentence and can aid visual learners to understand multiplication. Children need to understand at this stage that multiplication is COMMUTATIVE, that is that 2 x 3 will be the same as 3 x 2.

Progression

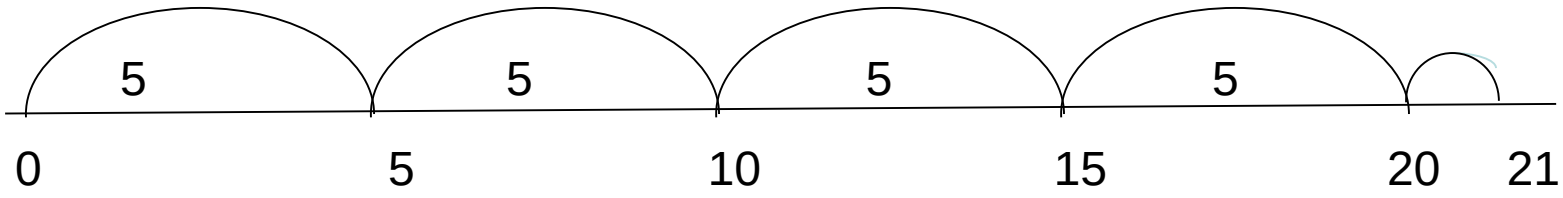
- Begin with arrays that represent the 2 times table
- Progress to arrays that represent the 10 times table
- Progress to arrays that represent the 5 times table

Division with Remainders

It is important to remember that the answer will be found by counting how many times the dividing number will go into the first number until it is impossible to do any more even jumps. The left over amount is the remainder and cannot be greater than or equal to the dividing number.

21 ÷ 5 = 4 r 1

How many 5's are in 21? There were 4 jumps of 5 with 1 left over.



Know x and related ÷ facts for the 2, 5 and 10 times tables. Count in 3's from 0.

Key Questions/Vocabulary

Share, share equally, share between
Divide, division, grouping
Remainder, left over
How many ... in...?
How many are left over?

Explanation

When children understand division and are able to accurately solve TU ÷ U with no remainders, then they are ready to solve more complex problems that do involve remainders.

Progression

- Begin with TU ÷ U where there is a remainder of 1
- Progress to TU ÷ U where there is a greater remainder