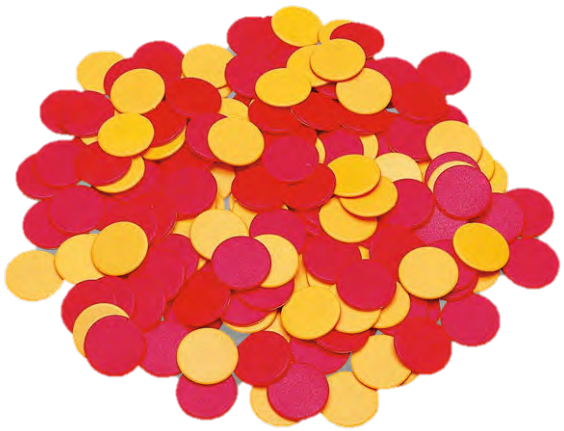
Calculation Journeys

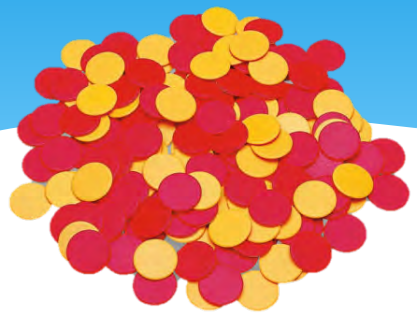
Miss Goreham

A Bit of Maths!

Please take some counters (each person needs one colour), a 100 square, a 1-6 die, a 1-10 die and a 1-20 die.



A Bit of Maths!



Aim: To get three counters in a line.

Rules: Rule the 1-20 die. You can either choose to place your counter on the number you rolled, or you can roll one of the other dice and then use one of the four operations on the two numbers rolled to create a different number to place your counter, e.g. 15 x 3, 15 + 3, 15 – 3 or 15 ÷3.

Aims

* To explain how we teach your children addition, subtraction, multiplication and division.
* To show you some of the resources we use.

By the end of Key Stage 1

* By the time your child leaves Key Stage 1, we want them to:
  - Recall key number facts, including number bonds for each number to 20, times table facts for 2, 3, 5 and 10.
  - Be able to partition 2-digit numbers in to tens and ones.
  - Have an efficient, reliable method of calculation for each operation.
  - Apply what they know.

Calculation Journeys

* In order to develop good mathematicians, at Woodside we understand the importance for nurturing a child's conceptual understanding of the four operations alongside, and in balance with, their procedural understanding.
  - Conceptual Understanding refers to their knowledge of Mathematical concepts.
  - Procedural Understanding refers to their knowledge of the process of doing a particular type of calculation.

Calculation Journeys

* Through the careful balance of conceptual and procedural understandings, we aim for children to develop 'number sense' and decide upon the most appropriate strategy for the calculation.
* We encourage them to think:
  - Can I do this in my head?
  - Can I do this in my head but need to jot something down to help me?
  - Do I need to use a full written method for this?

Calculation Journeys

* As will be seen the use of images and practical equipment is central to introducing number concepts, as well as mental and informal methods of calculation.
* Children therefore undertake a journey through each of the four operations, moving on to more efficient methods.
* It is expected that within a class children may be at different stages of a calculation journey – this is o.k.!

Addition

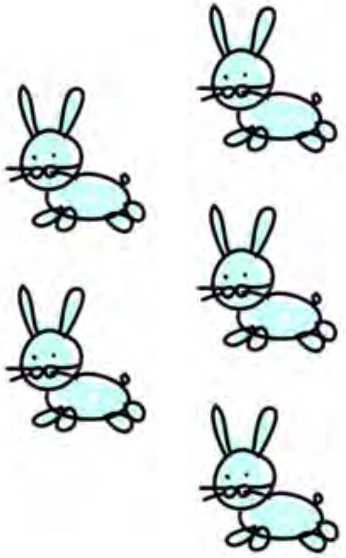
Addition – Stage 1

Concrete Representations

Concrete resources model how the addition of two groups is done through combining sets:

Written Representations

Mostly pictorial, e.g.



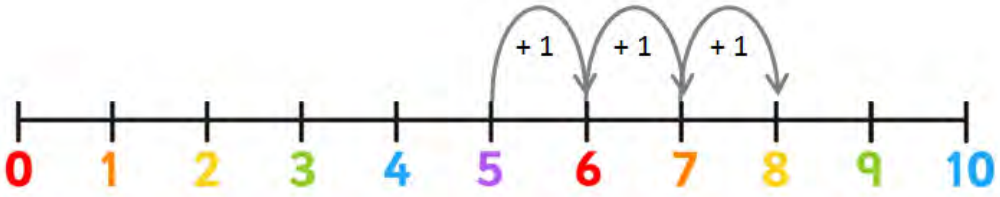
Addition – Stage 2

Concrete Representations

Still concrete resources!

Number tracks and hundred squares are used to count up on.

Number lines to count in series of singe jumps.



Written Representations

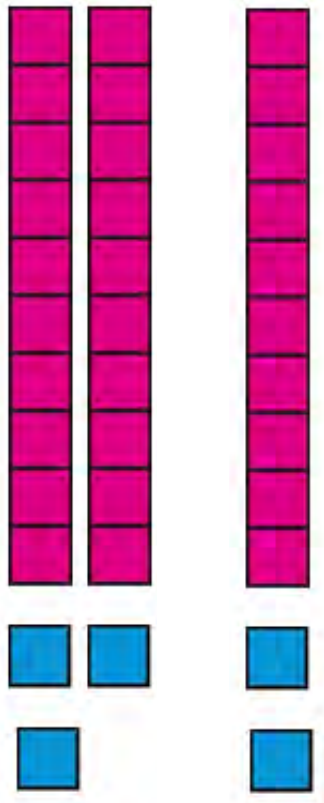
Children are beginning to create pictorial representations of the concrete representations, recording with them the corresponding number sentence.

Addition – Stage 3

Concrete Representations

Still concrete resources!!

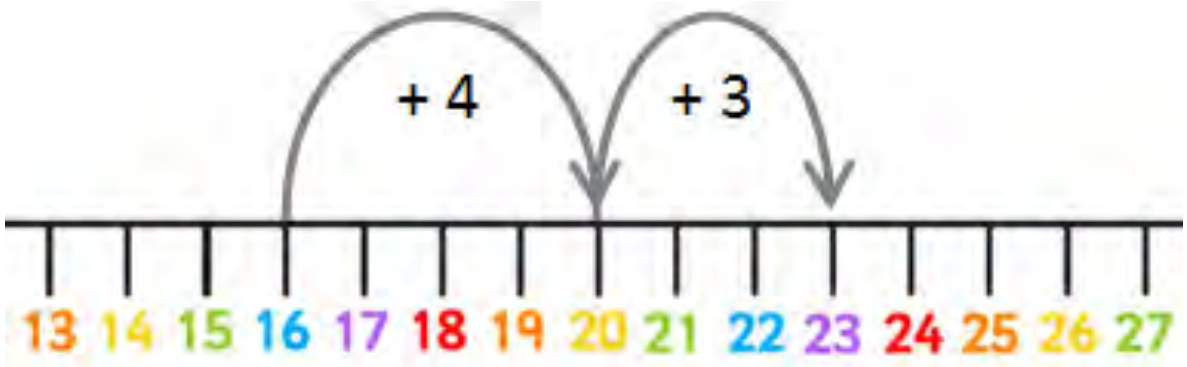
Children bring their knowledge of place value when adding 2-digit numbers using dienes (Base 10).



Addition – Stage 3

Concrete Representations

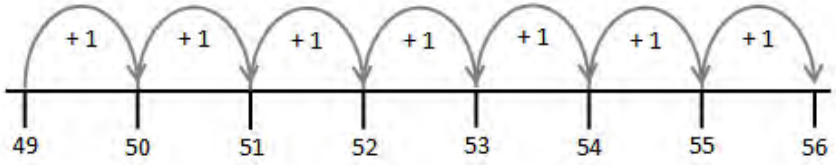
Also children bring their knowledge of number bonds when adding 1-digit numbers, jumping to the nearest 10 and then adding the rest.



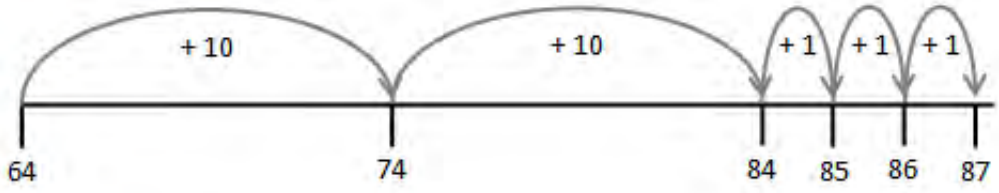
Addition – Stage 3

Written Representations

Empty number lines are used in a similar way as in the concrete representations, enabling children to work with larger numbers.



Children will also be able to use their knowledge of place value to work more efficiently by adding in jumps of tens and ones.



Subtraction

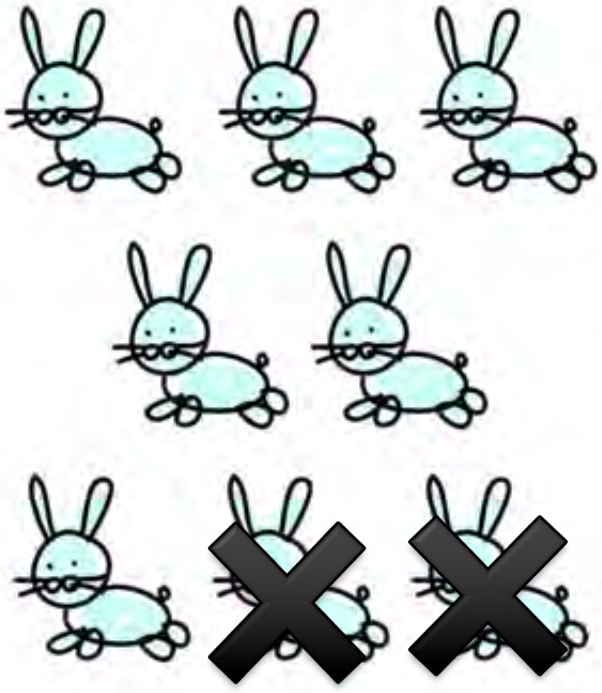
Subtraction – Stage 1

Concrete Representations

Concrete resources model how one number of objects is taken away from a larger group:

Written Representations

Mostly pictorial, e.g.



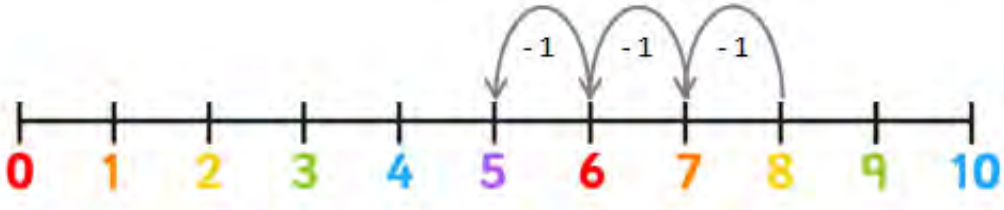
Subtraction – Stage 2
taking away

Concrete Representations

Still concrete resources!

Number tracks and hundred squares are used to count back on.

Number lines to count back a series of singe jumps.



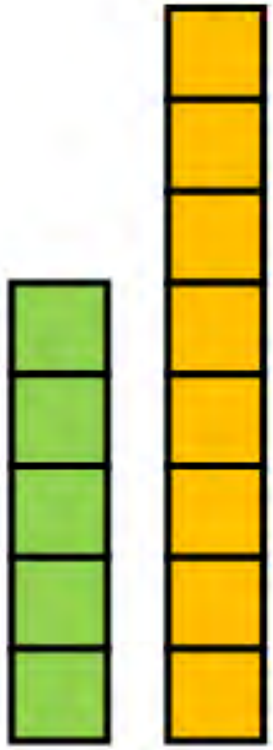
Written Representations

Children are beginning to create pictorial representations of the concrete representations, recording with them the corresponding number sentence.

Subtraction – Stage 2
finding the difference

Concrete Representations

Children begin to develop an understanding of subtraction as finding the difference by looking at two numbers and identifying 'how many more' one number is compared to the other.

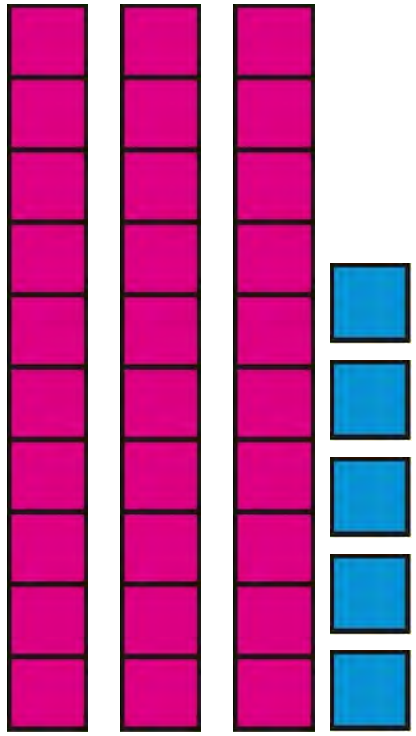


Subtraction – Stage 3
taking away

Concrete Representations

Still concrete resources!!

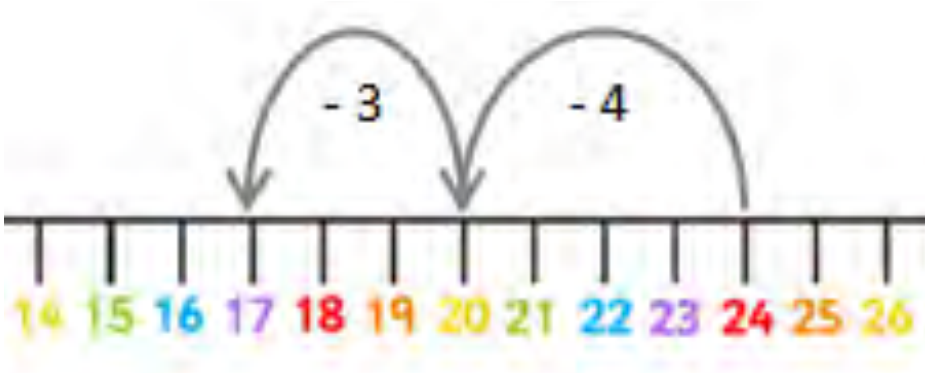
Children bring their knowledge of place value when subtracting 2-digit numbers using dienes (Base 10).



Subtraction – Stage 3
taking away

Concrete Representations

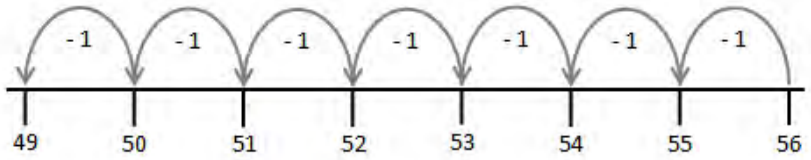
Also children bring their knowledge of number bonds when subtracting 1-digit numbers, jumping to the nearest 10 and then subtracting the rest.



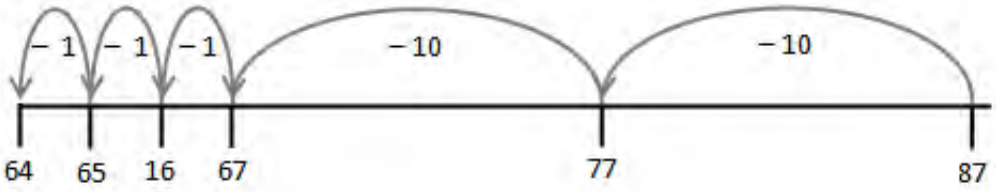
Subtraction – Stage 3
taking away

Written Representations

Empty number lines are used in a similar way as in the concrete representations, enabling children to work with larger numbers.



Children will also be able to use their knowledge of place value to work more efficiently by subtracting in jumps of tens and ones.



Subtraction – Stage 3
finding the difference

Concrete Representations

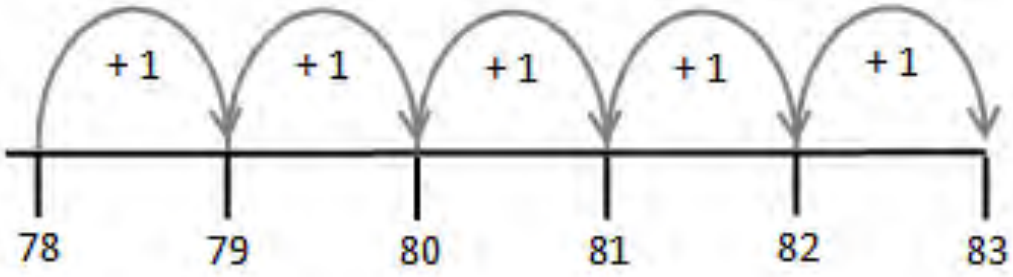
Children are able to find the difference practically by folding or cutting up number lines. They learn that the only bit that they are interested in, is the bit between the two numbers. This explains why you count up!

Subtraction – Stage 3
finding the difference

Written Representations

Empty number lines are used in a similar way as in the concrete representations, enabling children to work with larger numbers.

When finding the difference children need to add up the numbers in the jump to find the answer.



Multiplication

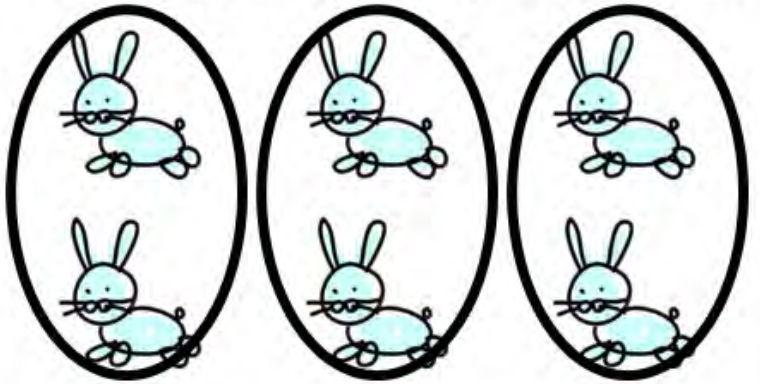
Multiplication – Stage 1

Concrete Representations

Concrete resource model how the groups of the same number of objects are counted out:

Written Representations

Mostly pictorial, e.g.



Multiplication – Stage 2

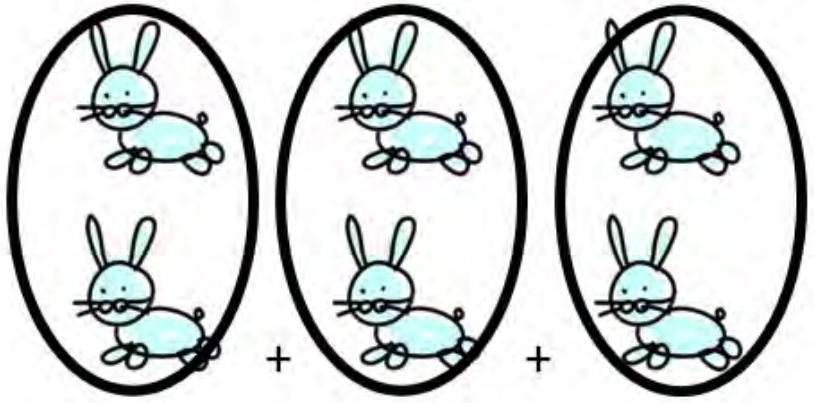
Concrete Representations

Number tracks are used to count up on in equal steps.

Multiplication – Stage 2

Written Representations

Children are beginning to create pictorial representations of the concrete representations, recording with them the corresponding number sentence.



Multiplication – Stage 3

2 x 4 = 8

Concrete Representations

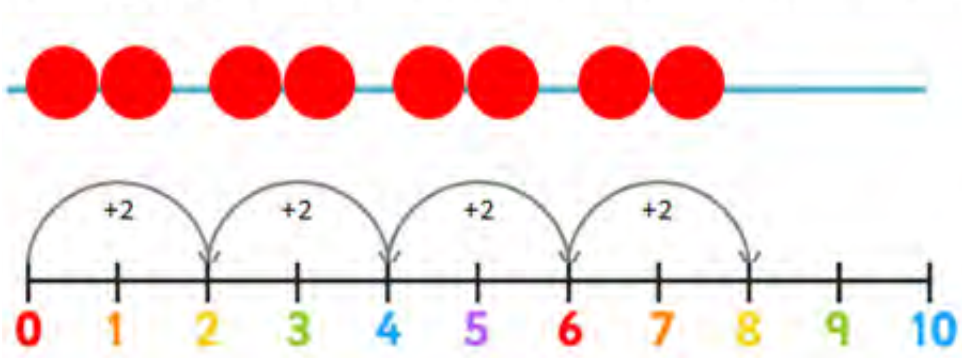
Children will be able to create and describe arrays using concrete resources:

4 x 2 = 8

Multiplication – Stage 3
repeated addition

Concrete Representations

They will also be able to show repeated addition on number lines. To strengthen understanding, children use concrete representations, such as bead strings, alongside the number lines.



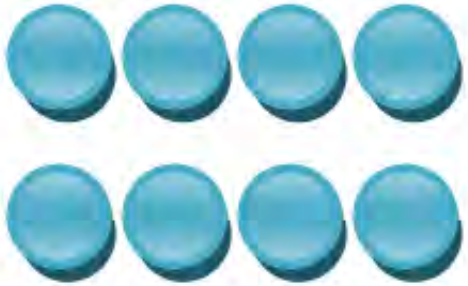
2 + 2 + 2 + 2 = 2 x 4 = 8

Multiplication – Stage 3

2 x 4 = 8

<u>Written Representations</u>

Children will be able to pictorial representations of their arrays.



4 x 2 = 8

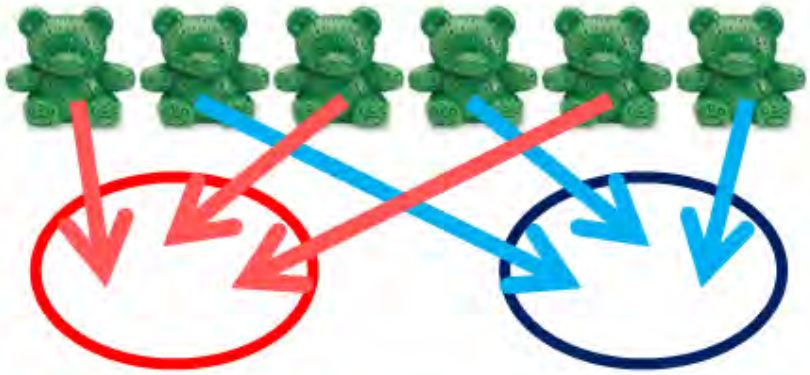
Division

Division – Stage 1

Concrete Representations

Practical activities involving:

Sharing



"How many are in each group?"

Grouping

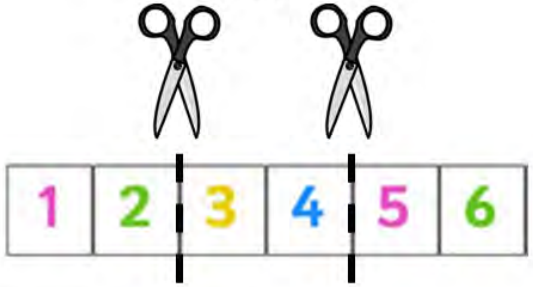
"How many groups are there?"

Division – Stage 2

Concrete Representations

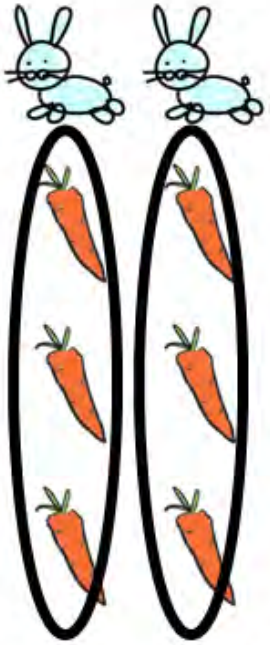
Children continue with practical activities, including being able to practically show grouping on a bead string.

Also number tracks are used for repeated subtraction – groups of numbers are cut off.



Division – Stage 2

Sharing



"How many are in each group?"

Written Representations

Pictorial representations of the concrete activities:

Grouping

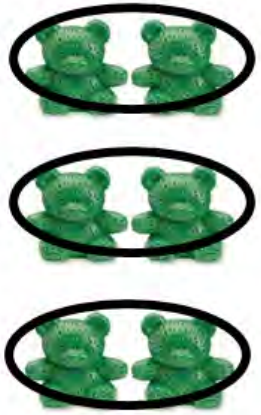
"How many groups are there?"

Division – Stage 3

Concrete Representations

Using a range of concrete resources, children practically arrange arrays.

Grouping



"How many groups are there?"

Sharing

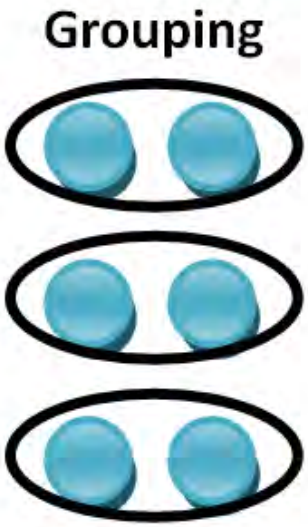
(between two children)

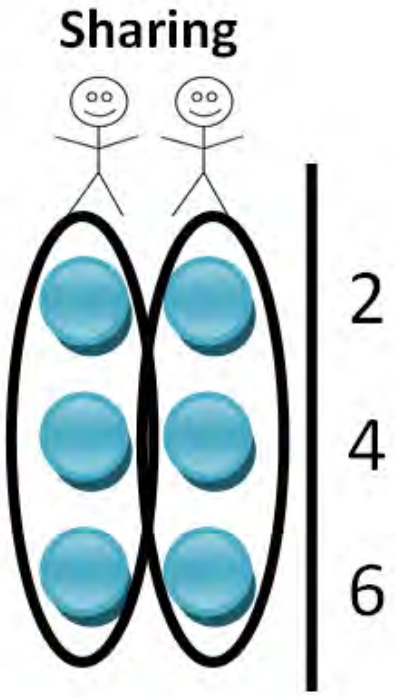
"How many are in each group?"

Division – Stage 3

Written Representations

Children create pictorial representations of the concrete activities, using their knowledge of arrays.





How can you support your child?

* Look for and talk about numbers in the environment
* Play games, e.g. making your own Matching Pairs game – question on one card, answer on another
* Shopping
* Counting on or backwards in steps of 1, 2, 3, 5 and 10.
* Number bonds
* Doubling and halving numbers
* Times tables