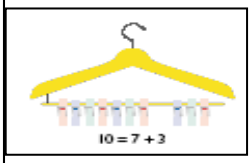
Statutory requirements

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- given a number, identify one more and one less
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
- read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- represent and use number bonds and
- related subtraction facts within 20
- X add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = – 9.

Vocabulary

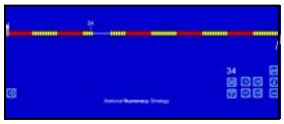
put together, +, add, more, plus
make, sum, total
altogether
score
double, near double
one more, two more… ten more
how many more to make…?
how many more is… than…?

Representations

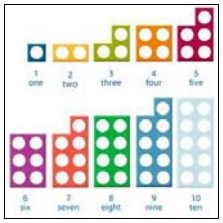


Number facts ITP

Twenty cards ITP



Counting on and back ITP



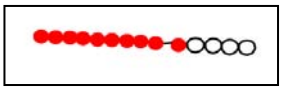
Numicon and Diennes equipment used to provide visual images of place value

Mental methods

Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, 9 + 7 = 16; 16 – 7 = 9; 7 = 16 – 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.
Pupils combine and increase numbers, counting forwards and backwards
Pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.

How many oranges do you think there are in this box?

Finding one more

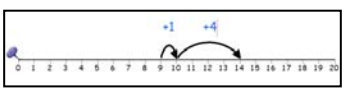


Use bead strings

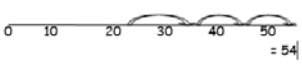
Using number facts:
'Story of 4,5, 6, 7, 8 and 9'
e.g. 7 = 7 +0 or 6 + 1 or 5 + 2 or 4 +3
Number bonds to 10
e.g. 5 + 5, 6 + 4, 7 + 3, 8 + 2, etc
Patterns using known facts
eg 4 + 3 = 7 so we know 24 + 3 = 27,34 + 3 = 37 etc

Pupils written jottings

5 +9= 14 (put larger number first)



24 +30 = 54



SUBTRACTION YEAR 1

Statutory requirements

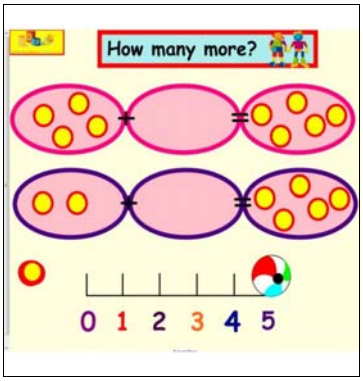
Pupils should be taught to:

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
- read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero

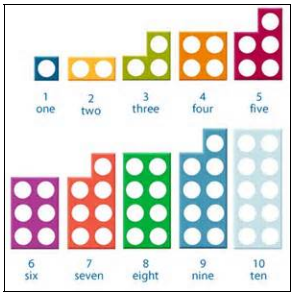
Vocabulary

–, subtract, take (away), minus
leave
how many are left/left over?
how many have gone?
one less, two less, ten less…
how many fewer is… than…?
how much less is…?
difference between
half, halve
=, equals, sign, is the same as

Representations



Balance scales to assist understanding of equals and missing number equations.



Numicon and Diennes equipment used to provide visual images of place value

Mental methods

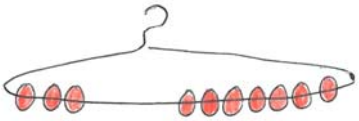
Count back in tens, *e.g. 53 – 20 as 53, 43, 33*

Using Place Value - Count back in ones and tens. E.g. knowing 53-1 or 53-10 without counting back in ones.

Taking away—count back in ones
e.g. 11-3= 15-4=

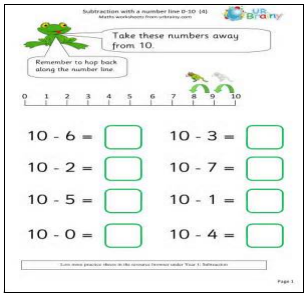
Using number facts

'Story' of 4, 5, 6, 7, 8 and 9, *e.g. 7 – 1 = 6, 7 – 2 = 5, 7 – 3 = 4, etc.*
Number bonds to 10, *e.g. 10 – 1 = 9, 10 – 2 = 8, 10 – 3 = 7, etc.*



Patterns using known facts, *e.g. 7 – 3 = 4 so we know 27 – 3 =, 47 – 3 =, 77 – 4 =, etc.*

Pupils written jottings



Number sentences written horizontally using a number line to count back and begin to introduce counting on to find the difference between two numbers.

Statutory requirements

- count in multiples of twos, fives and tens
- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Vocabulary

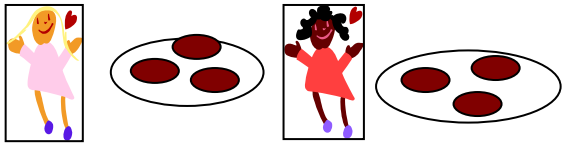
+, add, more, plus, make, sum, total, altogether, score, one more, two more… ten more number zero, one, two, three… to twenty and beyond zero, ten, twenty… one hundred how many…? count, count (up) to count on (from, to) count back (from, to)
count in ones, twos… tens… more, less, many, few odd, even, compare, double, near double, half, halve, pair, pattern, count out, share out, left, left over, count,

Representations

Counting in 2s

3 pairs of socks, there are 6 socks altogether.

2 girls have 3 cookies each, that's 6 cookies altogether.

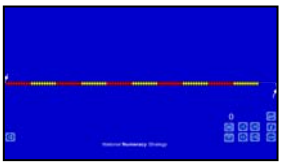


3 bags of cookies, 2 in each bag, that's 6 cookies altogether.

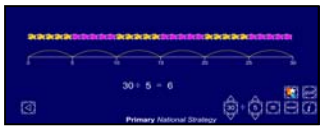
Introduce vocabulary 'groups of…' for more able e.g. 4 groups of 2 to explain collections

Counting in 10s and 5s.

50p altogether



Counting on and back ITP



Grouping ITP

Use of Numicon to count groups.

Doubling and halving
Find doubles to double 6 using fingers

Mental methods

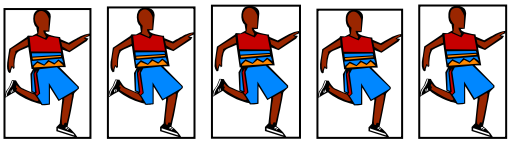
Orally counting in steps of 2,5 and 10.

Recall doubles to 10.

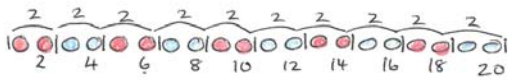
Begin to say what three 5s are by counting in 5s or what four 2s are by counting in 2s, etc.

Pupils written jottings

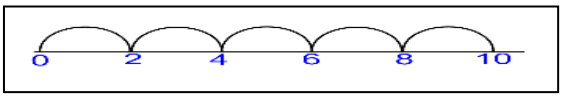
Girls have 3 cookies each, that's 6 cookies altogether.
3 + 3 = 6
3 bags of cookies, 2 in each bag, that's 6 cookies altogether.
2 + 2 + 2 = 6



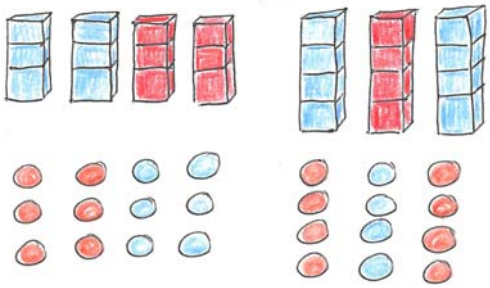
Counting in steps ('Clever' counting)
Count in 2s and 10s



counting people and feet- 5 groups of 2



Grouping
Begin to use visual and concrete arrays and 'sets of' objects to find the answers to '3 lots of 4' or '2 lots of 5', etc.



Ladybird spots to find doubles.

Division Year 1

Statutory requirements

Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Vocabulary

half, halve, count out, share out, left, left over
number sentence, sign, operation
Split, Separate, group
lots of, groups of, Array, row, column , equally group in pairs, threes… tens equal groups of ÷, divide, divided by, divided into left, left over

Representations

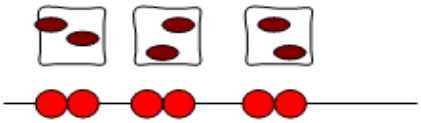
Numicon Images

Counting in 2s

We have got 6 socks. How many pairs have we got?
Children need to have equal opportunities to work on division as grouping and division as sharing

Division as grouping

6 cookies grouped in 2s, 3 bags of cookies.



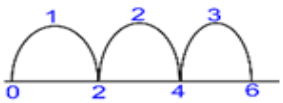
Division as sharing

6 cookies shared between 2 girls, 3 cookies each.

I have got 50p. How many 10p coins have I got?

10 20 30 40 50

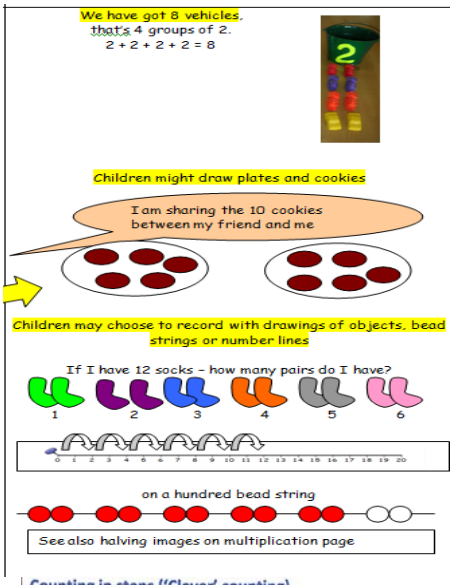
Use counting up in groups to encourage children to see this as a strategy for division: 'How many twos in six?'



Also see story contexts shown in Foundation Stage Multiplication page.

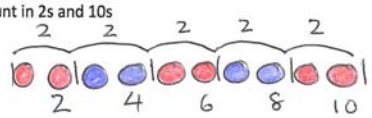
What pupils record - Mental and Jottings

Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities. They make connections between arrays, number patterns, and counting in twos, fives and tens.



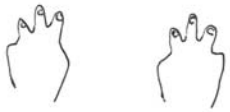
Counting in steps ('Clever' counting)

Count in 2s and 10s



Doubling and halving

Find half of even numbers up to 12 including realising that it is hard to halve an odd number

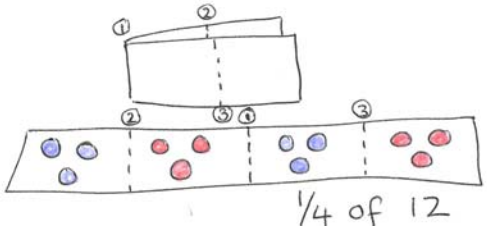


Grouping

Begin to use visual and concrete arrays and 'sets of' objects to find the answers to *'how many towers of 3 can I make with 12 cubes?'*

Sharing

Begin to find half of a quantity using sharing, *e.g. half of 16 cubes by giving one each repeatedly to two children*

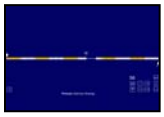


Statutory requirements

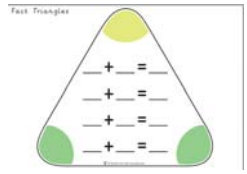
- use place value and number facts to solve problems.
- solve problems with addition and subtraction:
  - using concrete objects and pictorial representations, including those involving numbers, quantities and measures
  - applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Representations

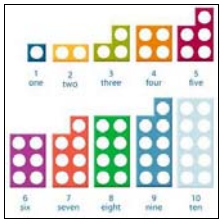
Number facts ITP



Counting on ITP



Number fact triangles



Numicon and Diennes equipment used to provide visual images of place value

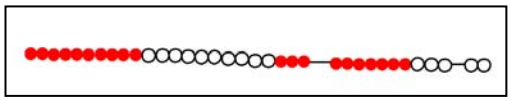
Vocabulary

+, add, addition, more, plus
make, sum, total
altogether
score
double, near double
one more, two more... ten more... one hundred more
how many more to make…?
how many more is… than…?
how much more is…?
tens boundary

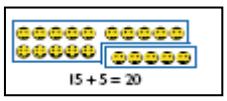
Mental methods

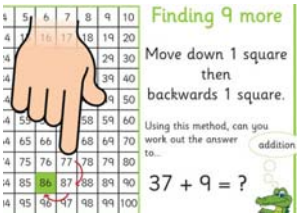
Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3 + 7 = 10; 10 – 7 = 3 and 7 = 10 – 3 to calculate 30 + 70 = 100; 100 – 70 = 30 and 70 = 100 – 30. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, 5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5). This establishes commutativity and associativity of addition.

Use of bead string eg 23 + 12 = 23 + 10 + 2



Building on known number facts eg I know 5 + 5 = 10 so I also know 15 + 5 = 20



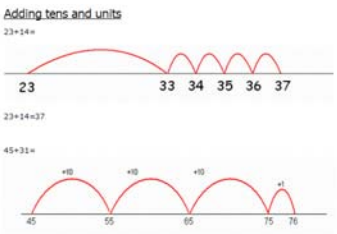


Add 10 and adjust

Bridge 10 eg 52—6 as 52—2—4

Partitioning one number
eg 34 + 25 = 34 + 20 = 54 + 5 = 59

Pupils written jottings



Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.

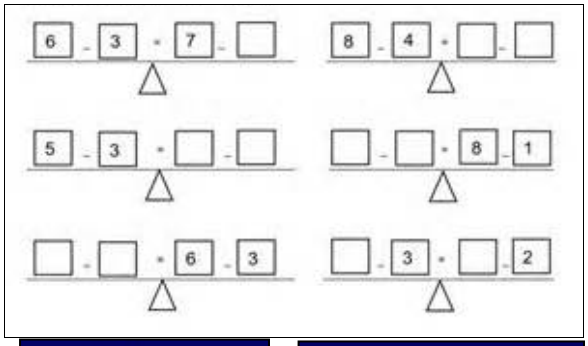
SUBTRACTION YEAR 2

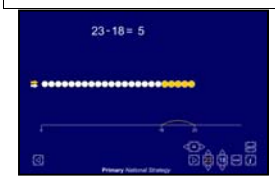
Statutory requirements

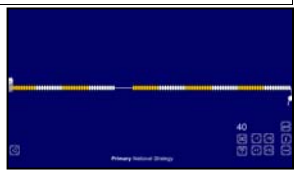
Pupils should be taught to solve problems with addition and subtraction:

- using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  a two-digit number and ones
  a two-digit number and tens
  two two-digit numbers
  adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Representations







Difference ITP

Use the Counting On and Back ITP to support the imagery of counting on and back in ones and tens

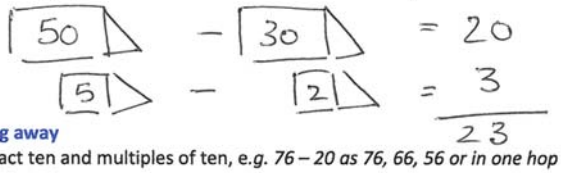
Vocabulary

–, subtract, subtraction, take (away), minus
leave, how many are left/left over?
one less, two less… ten less… one hundred less
how many fewer is… than…?
how much less is…?
difference between
half, halve
=, equals, sign, is the same as
tens boundary

Mental methods

Using Place value

Know 1 less or 10 less than any number, *e.g. 1 less than 74 or 10 less than 82*
Partitioning, *e.g. 55 – 32 as 50 – 30 and 5 – 2 combining the answers: 20 + 3*



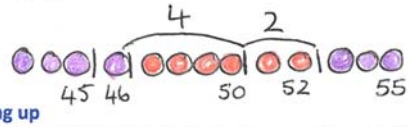
Taking away

Subtract ten and multiples of ten, e.g. *76 – 20 as 76, 66, 56 or in one hop 76 – 20 = 56*
Subtract two 2-digit numbers by counting back in tens then in ones, *e.g.* 67 – 33 as 67 subtract 30 (37) then count back 3 (34)
Subtracting near multiples, *e.g. 74 – 21 or 57 – 19*

Children could record these strategies on blank number lines as required.

Using number facts

Know pairs of numbers which make the numbers up to and including 10, *e.g. 10 – 6 = 4, 8 – 3 = 5, 5 – 2 = 3, etc.*
Patterns of known facts, *e.g. 9 – 6 = 3, so we know 39 – 6 = 33, 69 – 6 = 63, 89 – 6 = 83*
Bridge ten, *e.g. 52 – 6 as 52 subtract 2 then subtract 4 more*



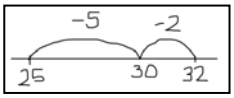
Counting up

Find a difference between two numbers on a line, *e.g. 51 – 47*

Written jottings

Children use number line jottings to count back, or on to find the difference.

On an empty number line 32 – 7 = 25
Start on 32, jump back 2 to 30, jump back 5



"Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers."

However children are not expected to calculate in columns in Y2, though this will prepare them for the Y3 expectation of columnar methods.

Children could lay out the calculation in a column and work it out on a number line recording the answer in the bottom of the column. (without doing any ex-

Statutory requirements

Pupils should be taught to:

- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward
- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative)
- solve problems involving multiplication , using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts.

Vocabulary

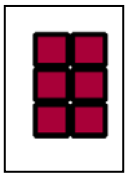
+, add, more, plus, make, sum, total, altogether, score, one more, two more… ten more number zero, one, two, three… to twenty and beyond zero, ten, twenty… one hundred how many…? count, count (up) to count on (from, to) count back (from, to)
count in ones, twos… tens… more, less, many, few odd, even, compare, double, near double, half, halve, pair, count out, share out, left, left over, count, sort, group and set, lots of, groups of
´, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times… ten times… times as (big, long, wide… and so on),
repeated addition, array, row, column, double, halve share and share equally.

Mental Methods

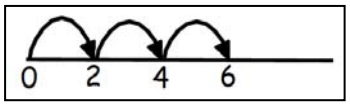
Count in 2s, 5s and 10s
Begin to count in 3s.
Begin to learn the 2x, 3x, 5x and 10x tables, seeing these as 'lots of', e.g. 5 lots of 2, 6 lots of 2, 7 lots of 2, etc.
Double numbers up to 20
Begin to double multiples of 5 to 100
Begin to double two-digit numbers less than 50 with 1s digits of 1, 2, 3 4 or 5

Representations

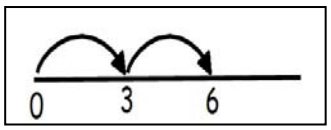
Look at different representations of arrays.

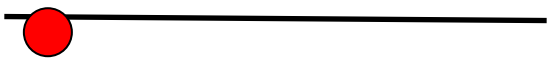


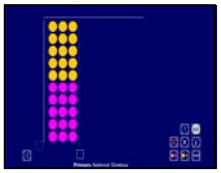
3 lots of 2,
3 groups of 2,
2 + 2 + 2 = 6
3 x 2 = 6
2 multiplied by 3

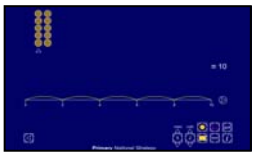


2 lots of 3
2 groups of 3
3 + 3 = 6
2 x 3 = 6
3 multiplied by 2



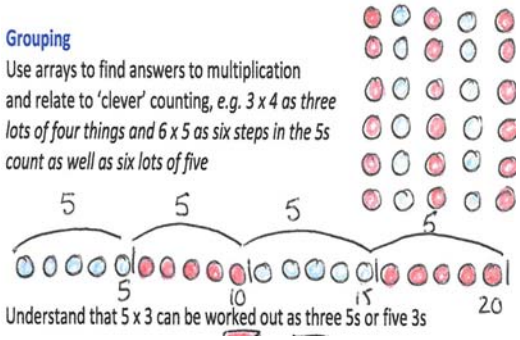


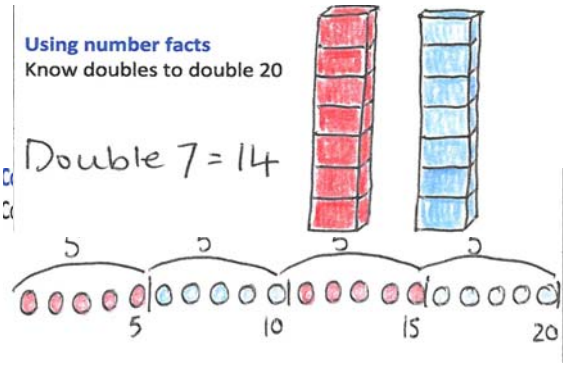




Multiplication array
ITP

Pupils' written jottings





Division Year 2

Statutory requirements

- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Vocabulary

Array row, column double, halve
share, share equally one each, two each, three each… group in pairs, threes… tens equal groups of
÷, divide, divided by, divided into
left, left over
Repeated addition

Mental and Jottings

They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face.
They begin to relate these to fractions and measures (for example, 40 ÷ 2 = 20, 20 is a half of 40).
They use commutativity and inverse relations to develop multiplicative reasoning (for example, 4 × 5 = 20 and 20 ÷ 5 = 4).

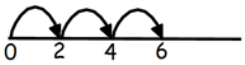
Representations

Numicon images

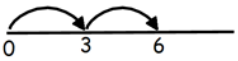
Models from real life images

What number sentences could we write about these images of arrays?

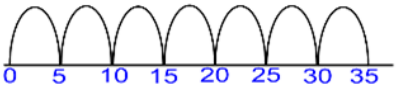
How many groups of 2 are there in 6? – there are 3
2 + 2 + 2 = 6
6 ÷ 2 = 3
6 divided into 2s is 3 groups



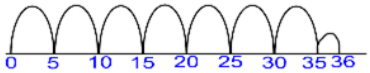
6 grouped into 3s is 2 groups
3 + 3 = 6
6 ÷ 3 = 2
6 divided into 3s is 2 groups



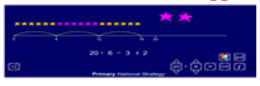
Grouping problem
Lollipops cost 5p, how many could I buy for 35p
35 ÷ 5 = 7



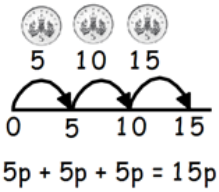
Sharing problem
I have 36 lollipops to share equally with 5 people how many will they each get? I know 5 x 7 = 35
36 ÷ 5 = 7 r 1
Modelling the structured then empty number line –



Use Grouping ITP and ICT resource suggestions on Steps to Success ITP



I have 15p how many 5p coins have I got



5p + 5p + 5p = 15p

15p ÷ 5p = 3

Children may show jumps of different sizes, e.g. 2s, 5s, 10s on an Empty Number Line

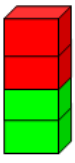
Describe the jumps if the last number is 9

Can you help Percy the Park Keeper share the 12 biscuits between rabbit, hedgehog and mole?

What if he had only 10 biscuits to share between them?

Halving

Can you make a tower that's half red and half green?



Folding a strip of stickers into half and then quarters