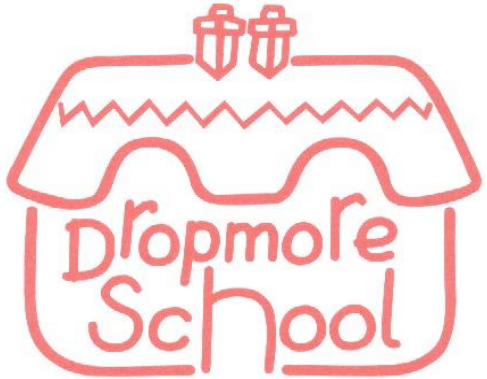
MATHS AT DROPMORE



Maths

NATIONAL CURRICULUM

Children should:

- Become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.

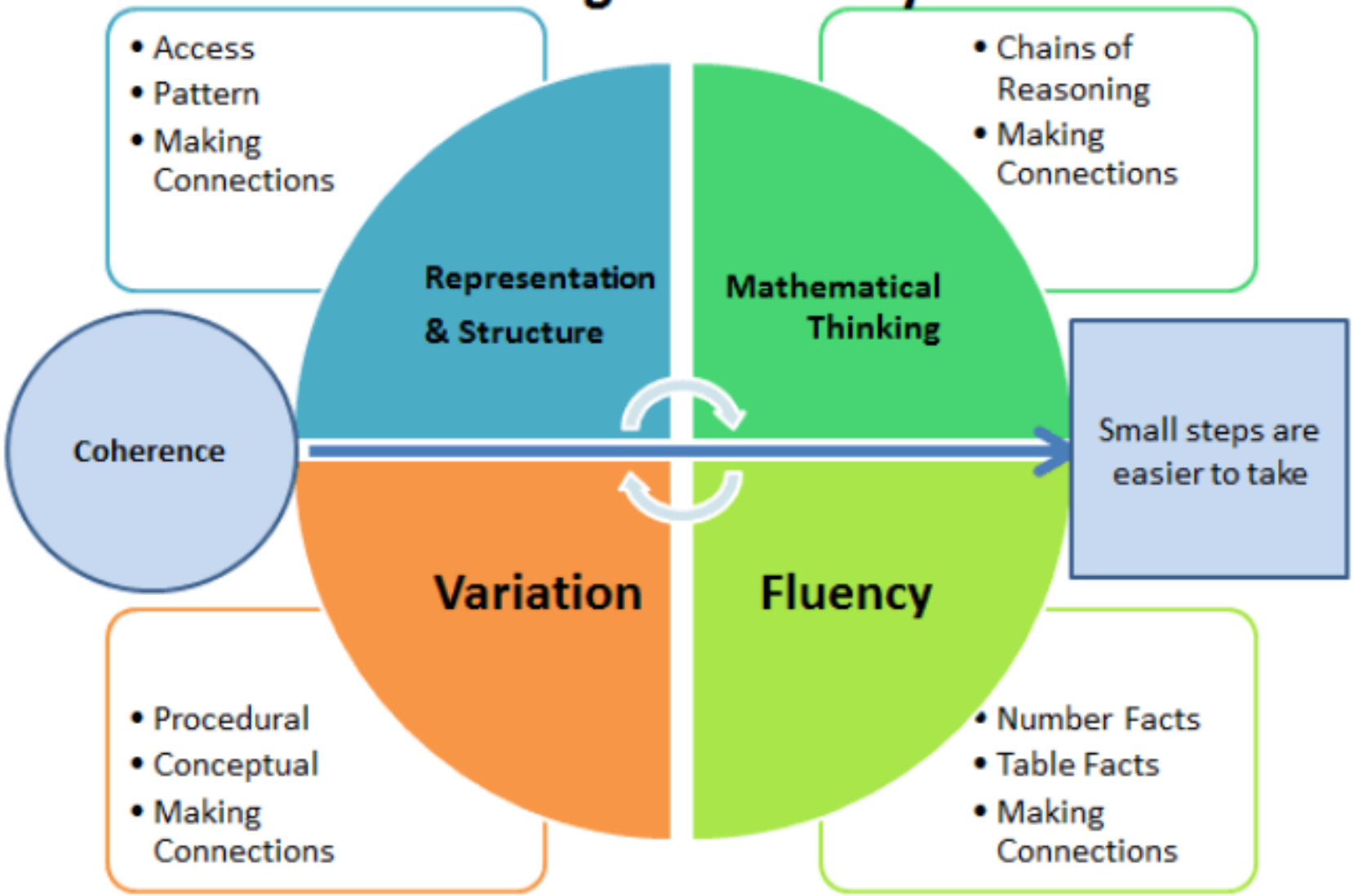
- **Reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations and developing an argument, justification or proof using mathematical language.

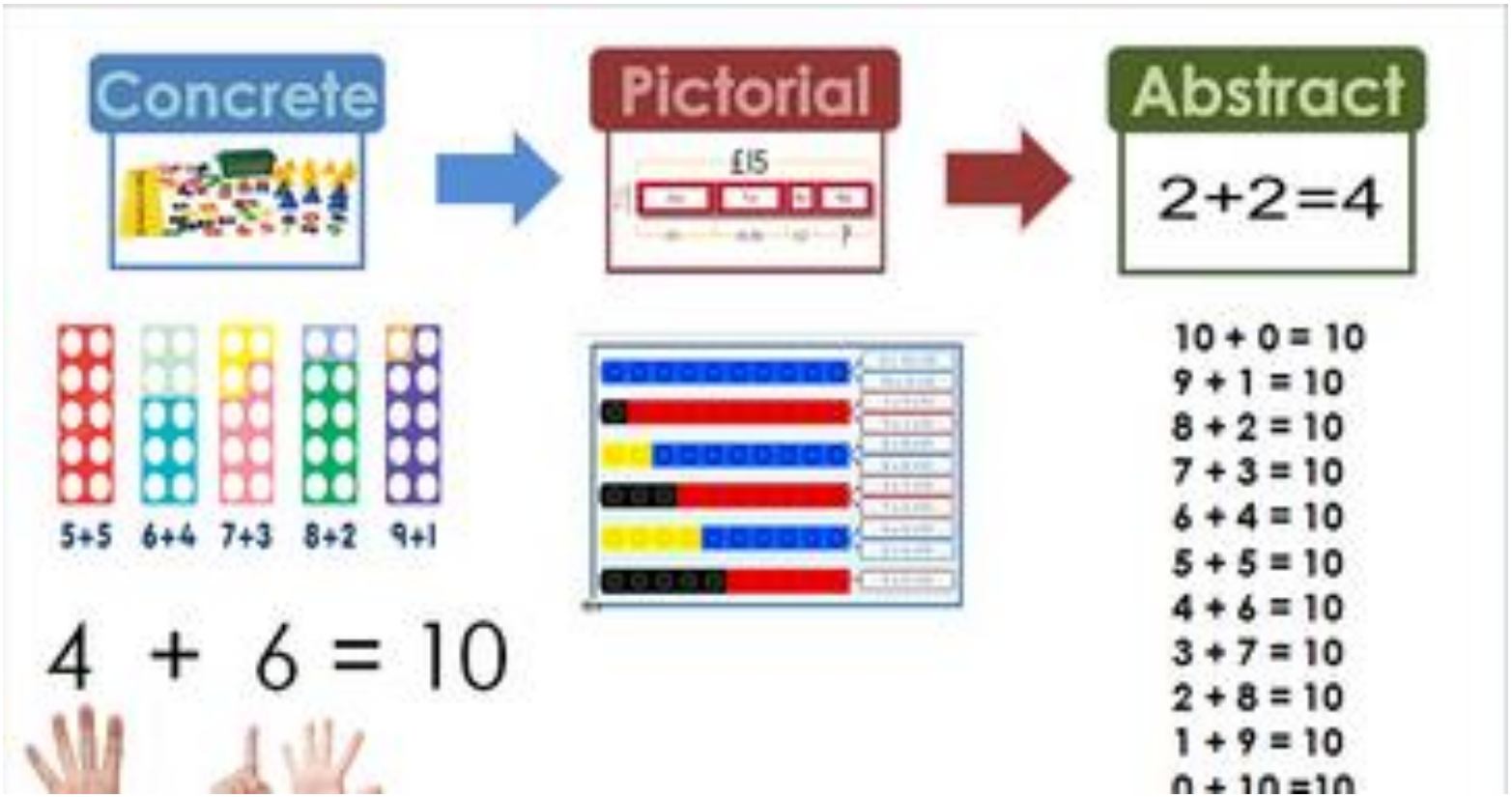
- **Solve problems** by applying their mathematics to a variety of problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

EYFS

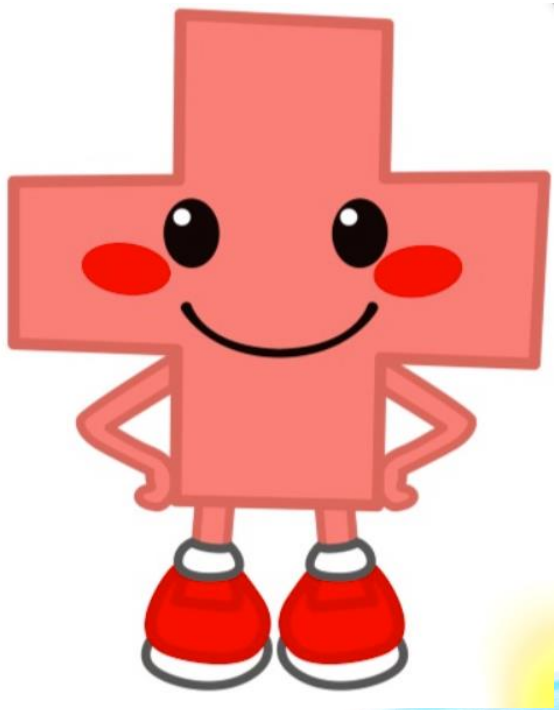
- Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number.
- Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.
- They solve problems, including doubling, halving and sharing.

Teaching for Mastery




Concrete
Pictorial
£15
Abstract
2+2=4
5+5
6+4
7+3
8+2
9+1
4 + 6 = 10
10 + 0 = 10
9 + 1 = 10
8 + 2 = 10
7 + 3 = 10
6 + 4 = 10
5 + 5 = 10
4 + 6 = 10
3 + 7 = 10
2 + 8 = 10
1 + 9 = 10

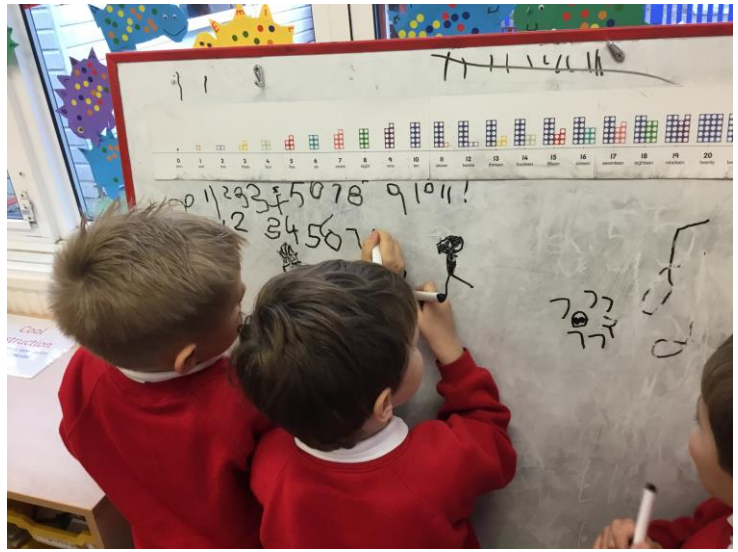
ADDITION



EYFS – RECEPTION

Early learning goals:

- Count reliably with numbers from 1 to 20, place them in order.
- Say which number is one more than a given number.
- Using quantities and objects, they add two single-digit numbers and count on to find the answer.

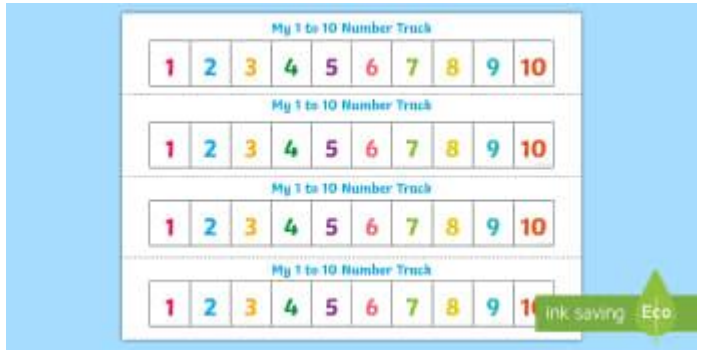


IDEAS AND RESOURCES

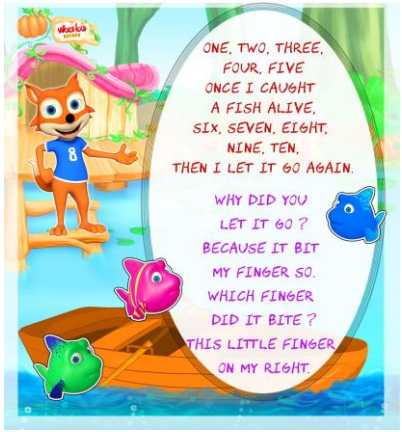
Objects to count:

Fingers

Number tracks:

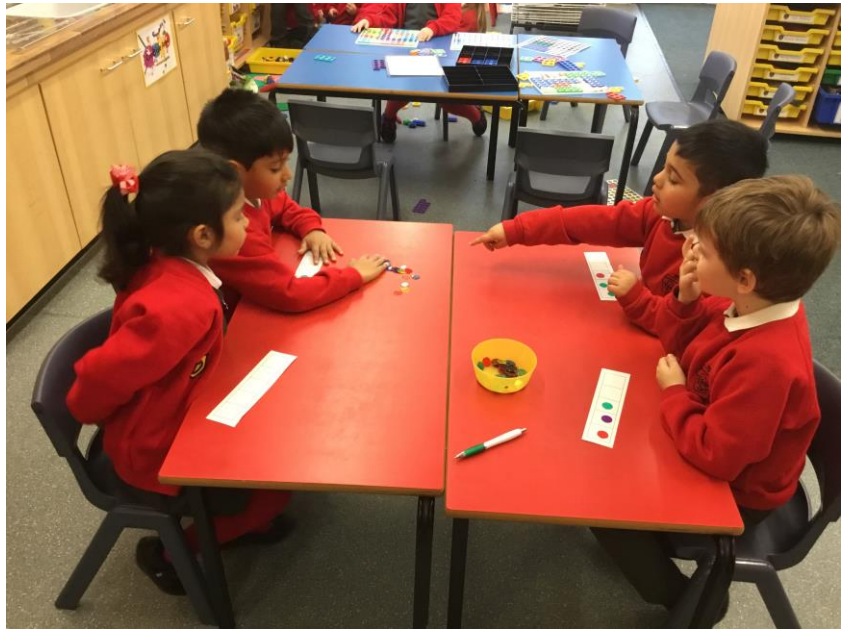


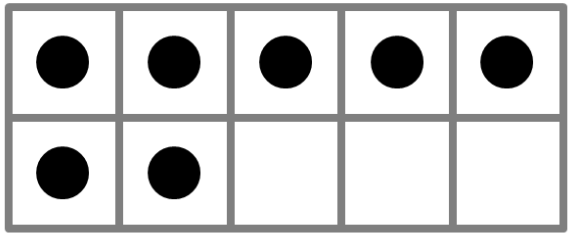
Number songs



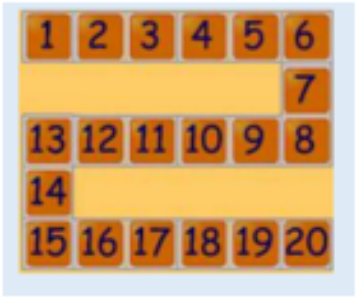
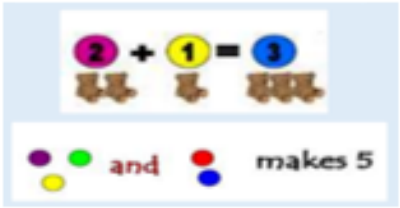
Numicon

5 and 10 frames





EXAMPLES

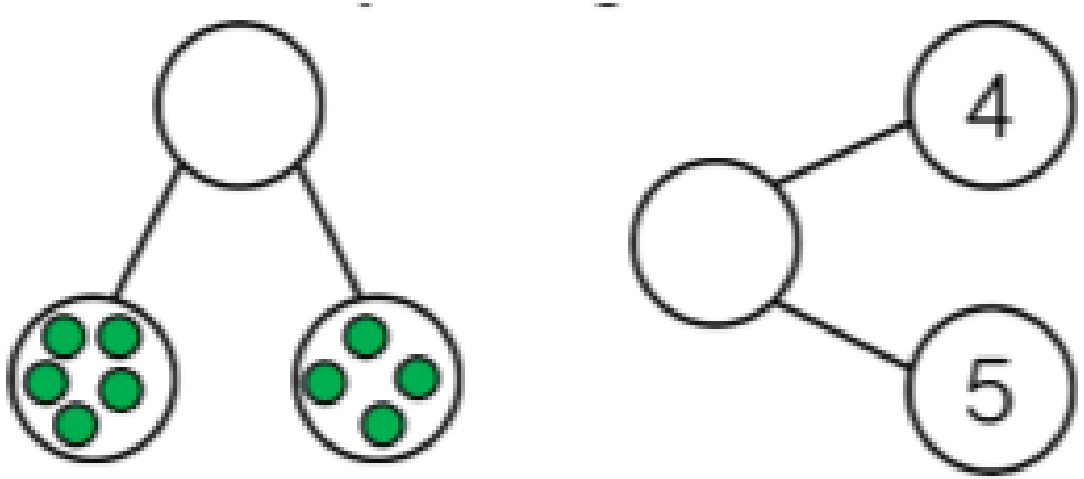
Recognise numbers up to 20 and understand the meaning of each number by recognising and knowing their clusters	Count on in ones and say which number is one more than a given number using a number line or number track to 20.	Begin to relate addition to combining two groups of objects using practical resources, role play, stories and songs.	Know that counting on is a strategy for addition. Use numbered number lines to 20.
 Numicon shapes are introduced straight away and be used to: • identify 1 more/less • combine pieces to add • find number bonds • add without counting 	 Number tracks can be introduced to count up on and to find one more: What is 1 more than 4? 1 more than 13? 	 Children can begin to combine groups of objects using concrete apparatus: Construct number sentences verbally or using cards to go with practical activities. Children are encouraged to read number sentences aloud in different ways: • "Three add two equals 5" • "5 is equal to three and two" • "5 is the same as three and two" Children make a record in pictures, words or symbols of addition activities.	

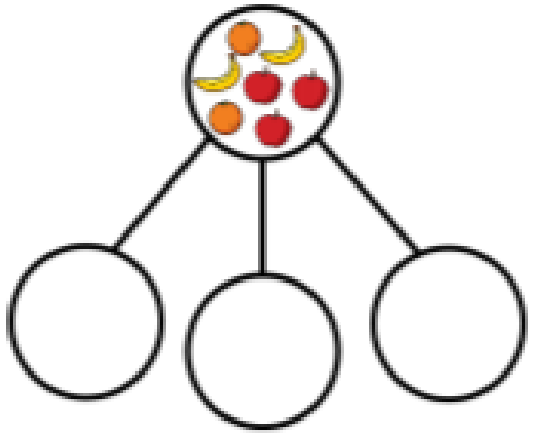
KEY STAGE 1 – YEAR 1

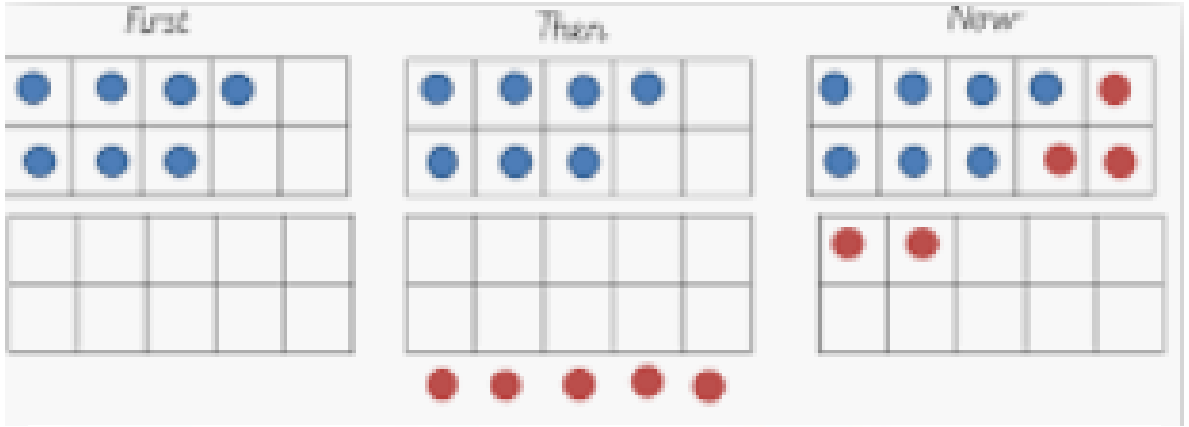
- To represent and use number bonds and related subtraction facts within 20. (Number bonds to 20)
- Recall pairs of numbers which total 10 (number bonds to 10)
- Identify near doubles using doubles already known
- Add and subtract one – digit numbers to 20 including :
  - Add more than two numbers
- Read and write numbers to 100 in numerals, inc 1 – 20 in words
- Count to and across 100
- Solve simple 1-step problems involving addition, using objects, number lines and pictorial representations.
- Read and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.

- Key Vocabulary: add, more , plus, and , make, altogether total, equal to, equals, double, most , count on, number line

MODELS AND RESOURCES
PART WHOLE MODEL/ TEN FRAME

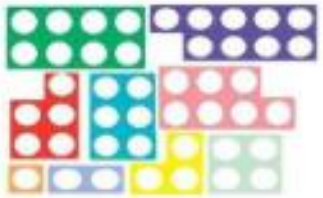






Concrete

Use the numicon to show how you can make number bonds to 10.



Pictorial

Draw a bar to represent number bonds to 10.

Abstract

Write number bonds to 10 in a logical order.

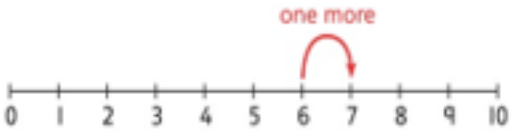
EXAMPLES

Counting and adding more

Children add one more cube or counter to a group to represent one more.

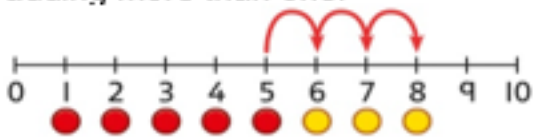
One more than 4 is 5.

Use a number line to understand how to link counting on with finding one more.



One more than 6 is 7.
7 is one more than 6.

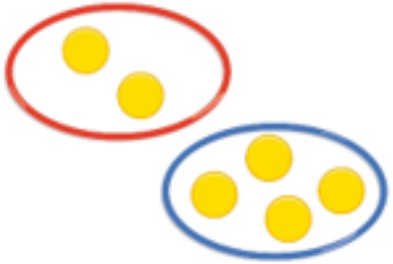
Learn to link counting on with adding more than one.



5 + 3 = 8

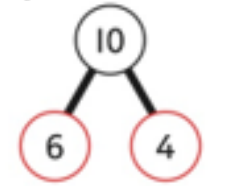
Understanding part-part – whole relationship

Children draw to represent the parts and understand the relationship with the whole.



The parts are 1 and 5. The whole is 6.

Use a part-whole model to represent the numbers.



6 + 4 = 10

EXAMPLES

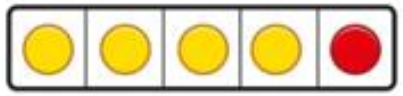
Knowing and finding number bonds within 10

Break apart a group and put back together to find and form number bonds.

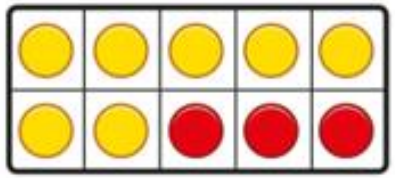
3 + 4 = 7

6 = 2 + 4

Use five and ten frames to represent key number bonds.



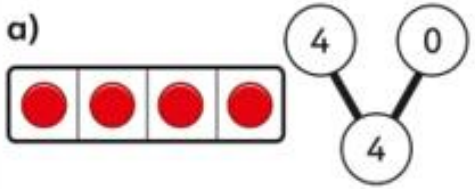
5 = 4 + 1



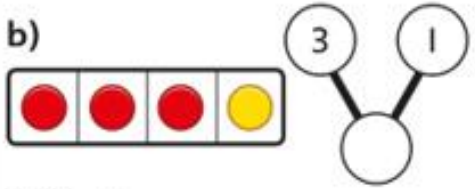
10 = 7 + 3

Use a part-whole model alongside other representations to find number bonds. Make sure to include examples where one of the parts is zero.

a)



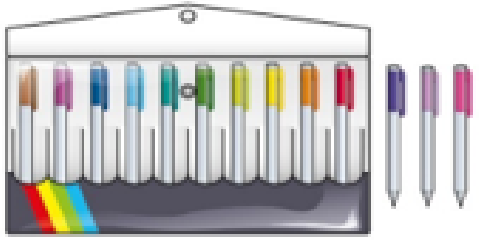
b)



4 + 0 = 4
3 + 1 = 4

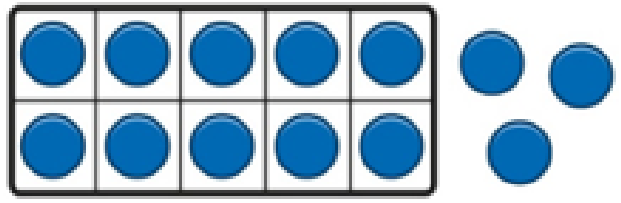
Understanding teen numbers and a complete 10 and some more

Complete a group of 10 objects and count more.



13 is 10 and 3 more.

Use a ten frame to support understanding of a complete 10 for teen numbers.



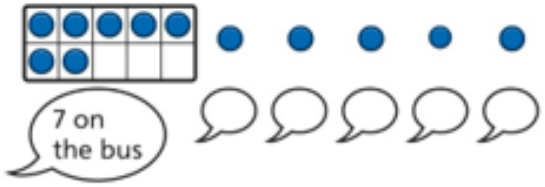
13 is 10 and 3 more.

EXAMPLES

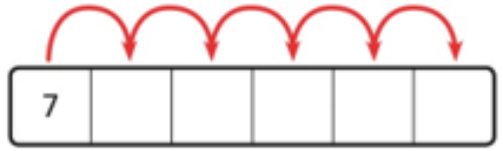
Adding by counting on

Children use knowledge of counting to 20 to find a total by counting on using people or objects.

Children use counters to support and represent their counting on strategy.



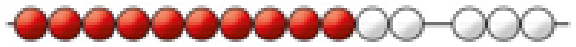
Children use number lines or number tracks to support their counting on strategy.



7 + 5 = ☐

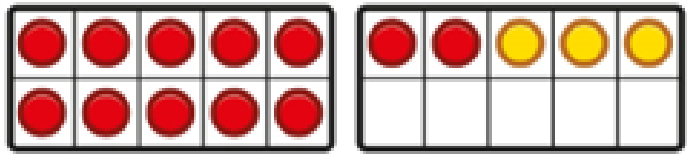
Adding 1s

Children use bead strings to recognise how to add the 1s to find the total efficiently.



2 + 3 = 5
12 + 3 = 15

Children represent calculations using ten frames to add a teen and 1s.



2 + 3 = 5
12 + 3 = 15

Children recognise that a teen is made from a 10 and some 1s and use their knowledge of addition within 10 to work efficiently.

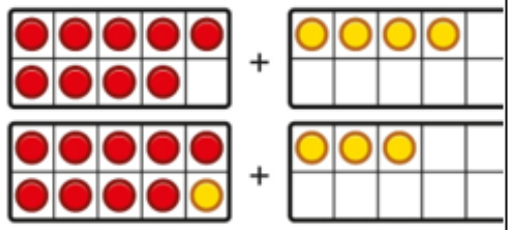
3 + 5 = 8
So, 13 + 5 = 18

Bridging the 10 using number bonds

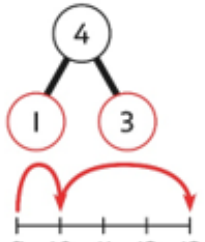
Children use a bead string to complete a 10 and understand how this relates to the addition.

7 add 3 makes 10.
So, 7 add 5 is 10 and 2 more.

Children use counters to complete a ten frame and understand how they can add using knowledge of number bonds to 10.



Use a part-whole model and a number line to support the calculation.

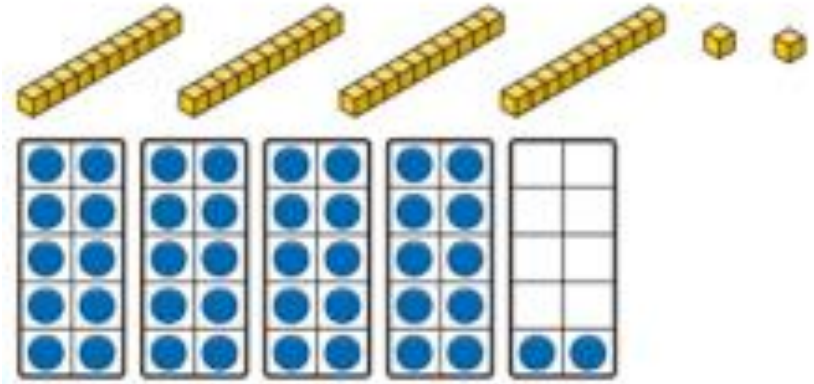


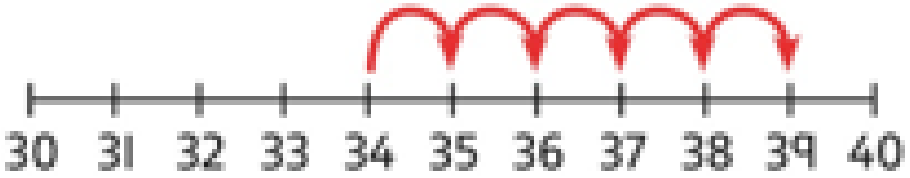
9 + 4 = 13

KEY STAGE 1 – YEAR 2

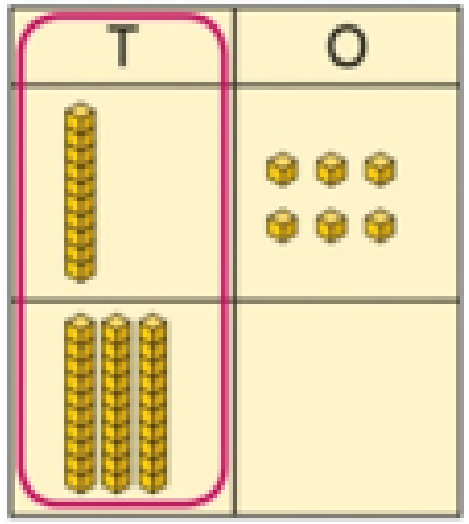
- Pupils should be taught to solve problems with addition and subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their knowledge of mental and written methods.
- Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- Add and subtract numbers using concrete objects, pictorial representations an mentally, including a two digit number and 1's . A two- digit number and 10s, 2 digit numbers and adding 3 one-digit numbers.
- Show that addition of 2 numbers can be done in any order(commutative) and subtraction of 1 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.

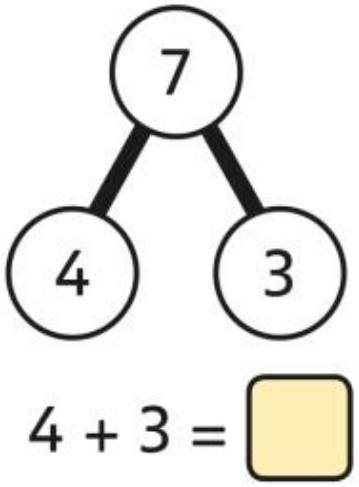
MODELS AND RESOURCES
NUMBER LINE/ BLANK NUMBER LINE
BASE TEN





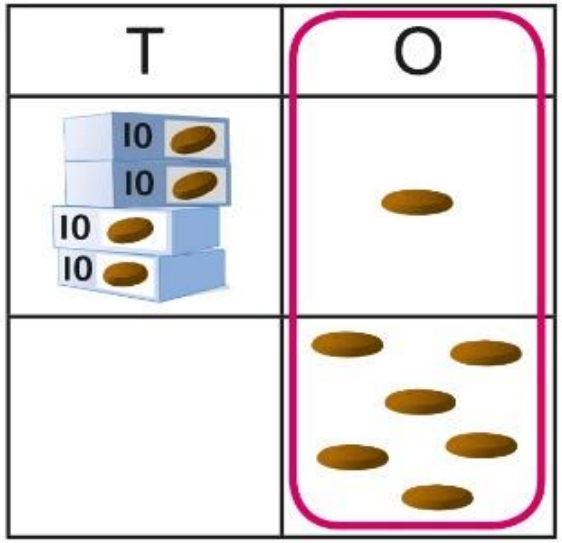
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

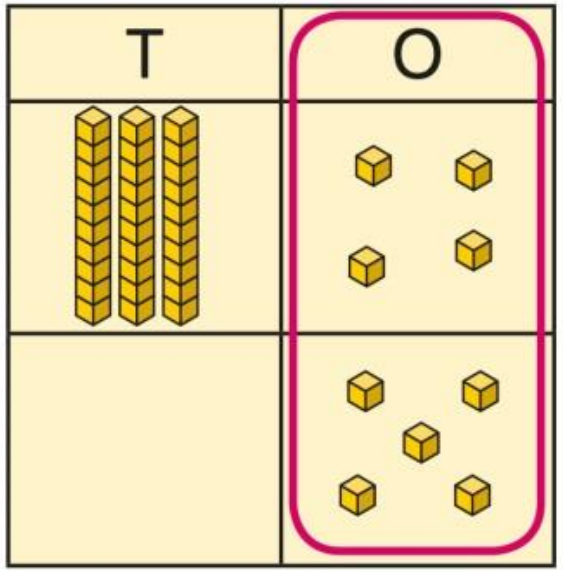




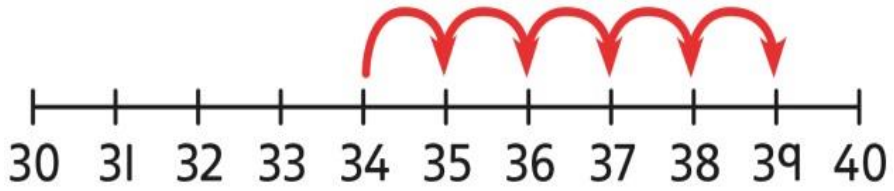
EXAMPLES

Adding a 1-digit number and a 2 –digit number not bridging a 10



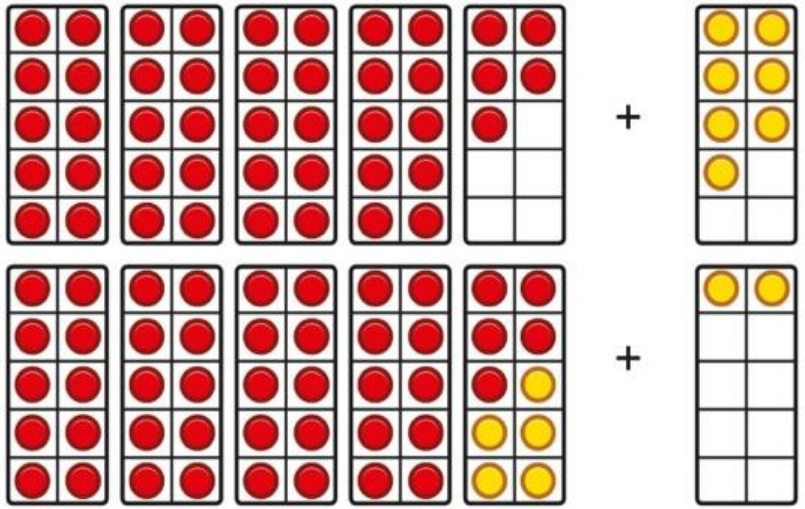


	T	O
	3	4
+		5
		9



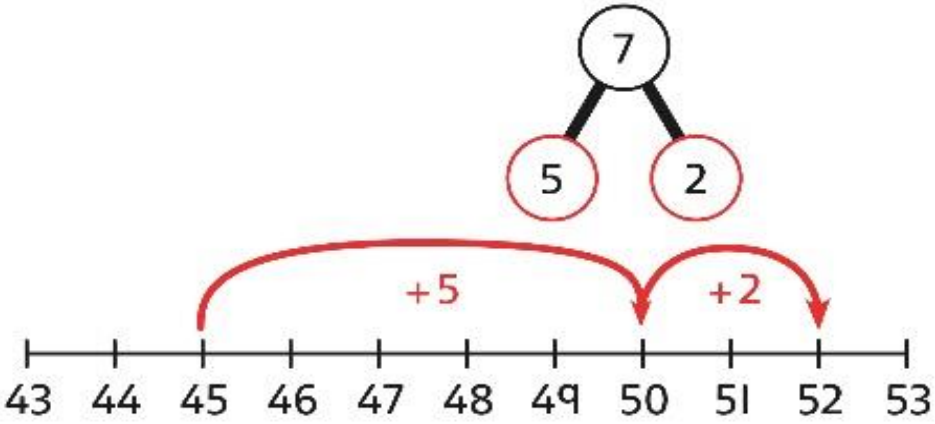
EXAMPLES

Adding a 1 –digit number and a 2-digit number bridging 10



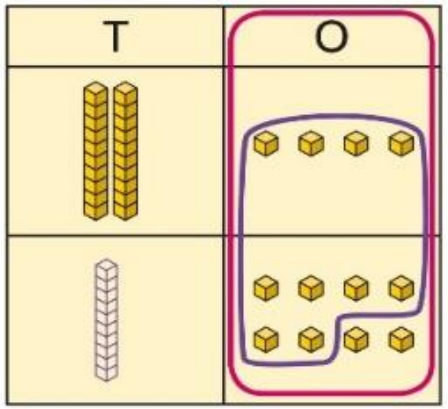
$7 = 5 + 2$

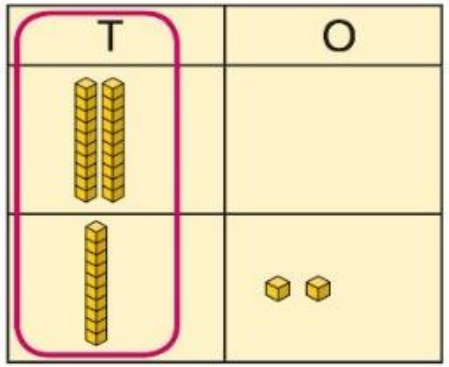
$45 + 5 + 2 = 52$

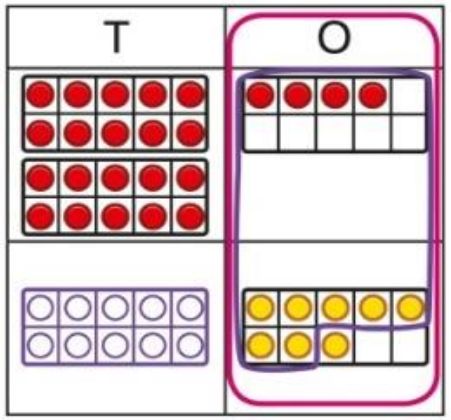


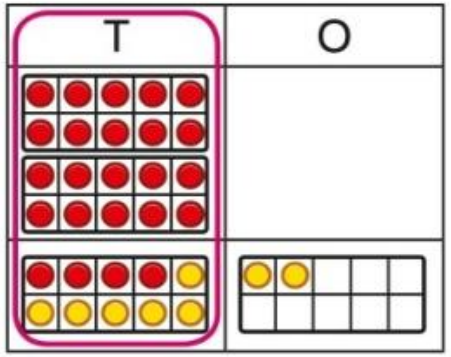
EXAMPLES

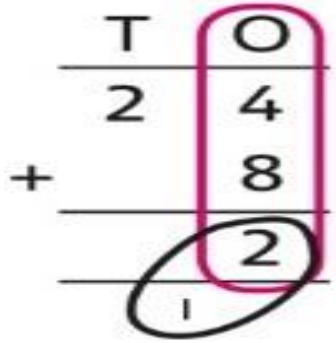
Adding a 2 digit number and a single digit

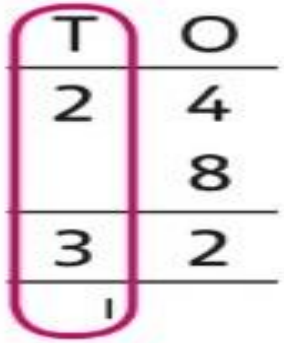






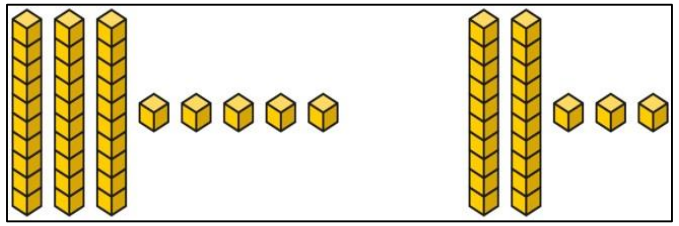


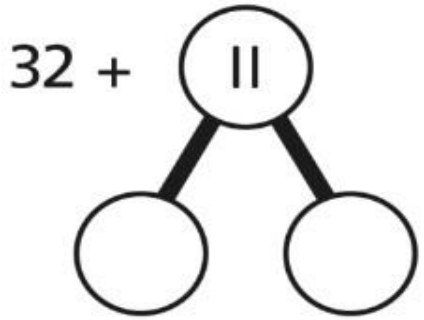




EXAMPLES

Adding two 2 digit numbers



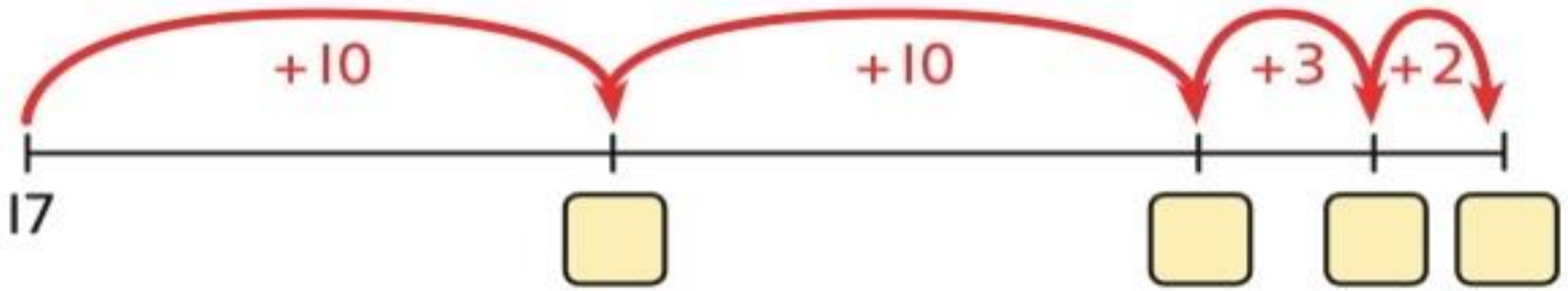


11 = 10 + 1

32 + 10 = 42

42 + 1 = 43

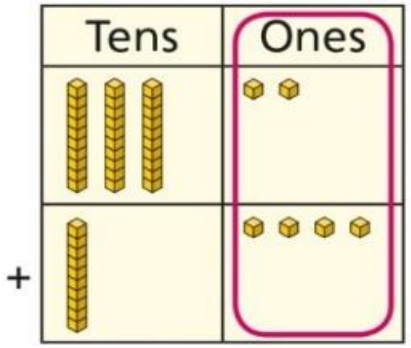
32 + 11 = 43



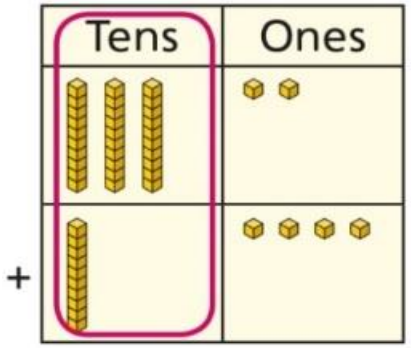
T	O
1	7
+ 2	5

EXAMPLES

Adding two 2 digit numbers

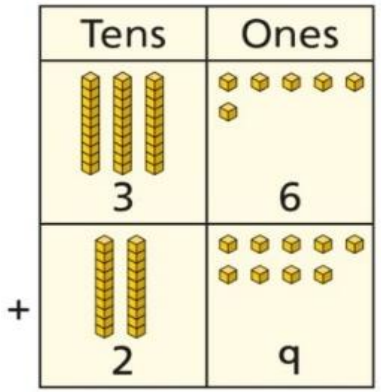


	T	O
	3	2
+	1	4
		6

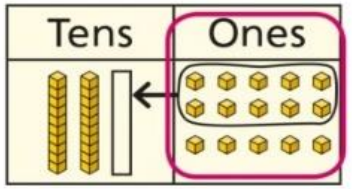


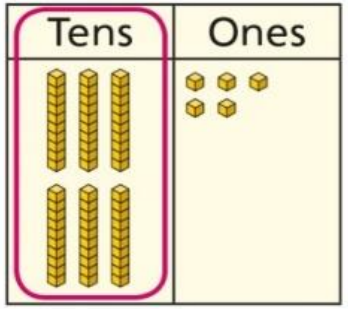
	T	O
	3	2
+	1	4
	4	6

Adding two 2 digit numbers with exchanging



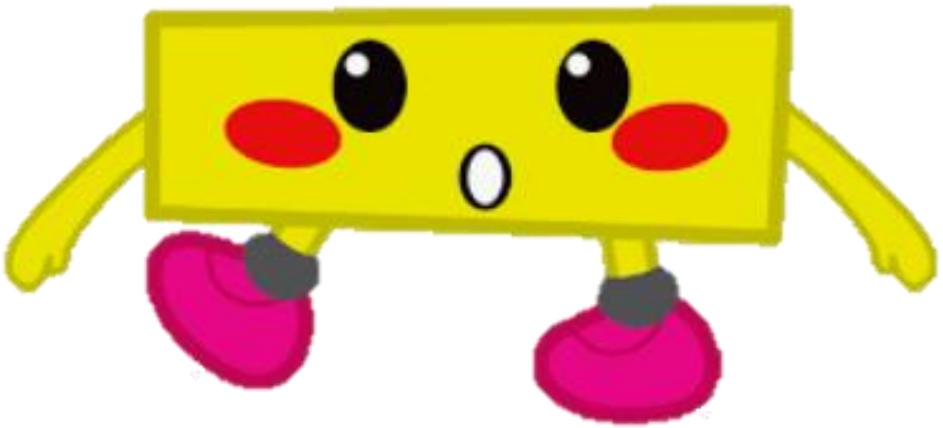
	T	O
	3	6
+	2	9
		5
	1	





	T	O
	3	6
+	2	9
	6	5
	1	

SUBTRACTION

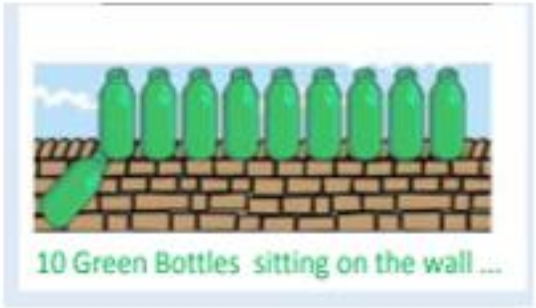
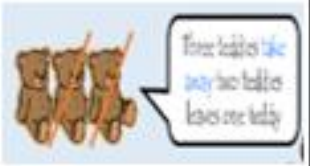
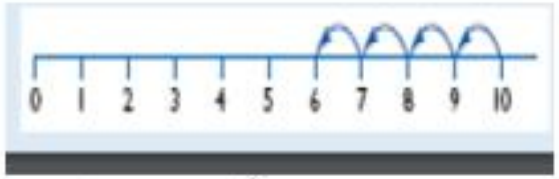


EYFS – RECEPTION

Early learning goals:

- Count reliably with numbers from 1 to 20, place them in order.
- Say which number is one less than a given number.
- Using quantities and objects, they subtract two single-digit numbers and count back to find the answer.

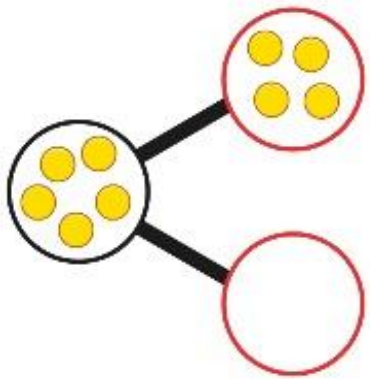
MODELS AND EXAMPLES

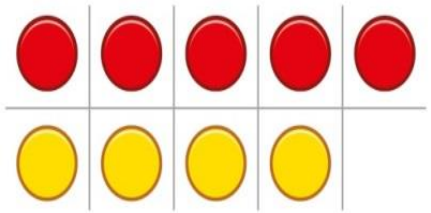
Say which number is one less than a given number using a number line or number track to 20.	Begin to count backwards in familiar contexts such as number rhymes or stories.	Begin to relate subtraction to 'taking away' using concrete objects and role play.	Count backwards along a number line to 'take away'
Number tracks can be introduced to count back and to find one less: What is 1 less than 9? 1 less than 20? 	 Children make a record in pictures, words or symbols of subtraction activities. 	Concrete apparatus is used to relate subtraction to taking away and counting how many objects are left. Concrete apparatus models the subtraction of 2 objects from a set of 5.  Construct number sentences verbally or using cards to go with practical activities. Children are encouraged to read sentences aloud in different ways "five subtract one leaves four" "four is equal to five subtract one" "four is the same as five subtract one" Solve simple problems using fingers 	

KEY STAGE 1 – YEAR 1

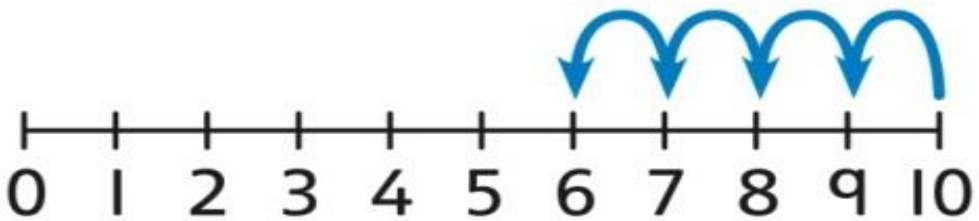
- To represent and use number bonds and related subtraction facts within 20.
- Recall addition doubles up to 5 + 5
- Recall addition and subtraction facts up to 5
- Recall pairs of numbers which total 10
- Identify near doubles using doubles already known
- Add and subtract one – digit numbers to 20 including :
  - Add more than two numbers
- Read and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.

MODELS AND RESOURCES





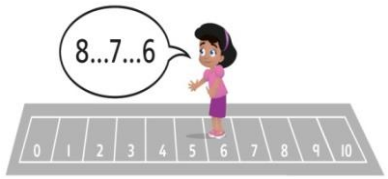
5 – 4 = ☐



EXAMPLES

Counting on

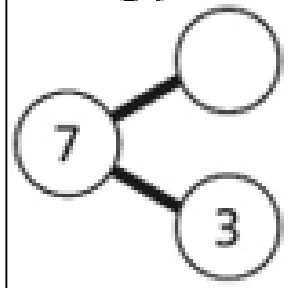
Children count back to take away and use a number line or number track to support the method.



9 − 3 = 6

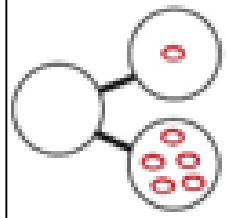
Finding a missing part

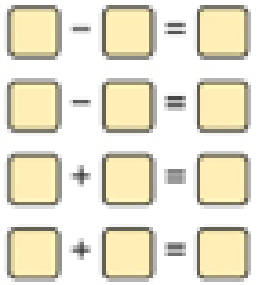
Children use a part-whole model to support the subtraction to find a missing part.



7 − 3 = 4

Children develop an understanding of the relationship between addition and subtraction facts in a part-whole model





Finding the difference

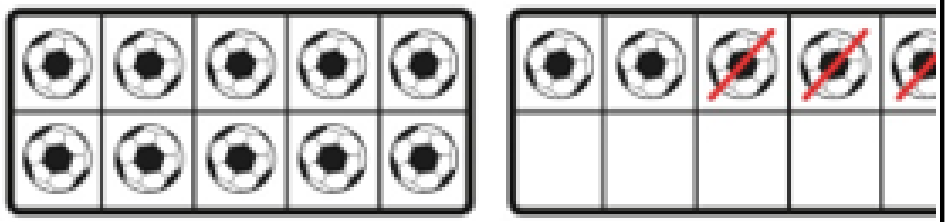
Children understand 'find the difference' as subtraction.

10 − 4 = 6
The difference between 10 and 6 is 4.

EXAMPLES

Subtraction within 20

Understand when and how to subtract 1s efficiently.

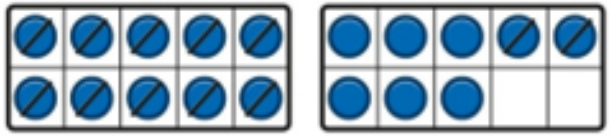


5 − 3 = 2
15 − 3 = 12

Subtracting tens and ones

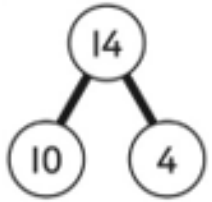
For example: 18 − 12

Use ten frames to represent the efficient method of subtracting 12.



First subtract the 10, then subtract 2.

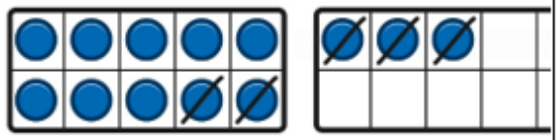
Use a part-whole model to support the calculation.



19 − 14
19 − 10 = 9
9 − 4 = 5
So, 19 − 14 = 5

Subtracting bridging 10 using number bonds

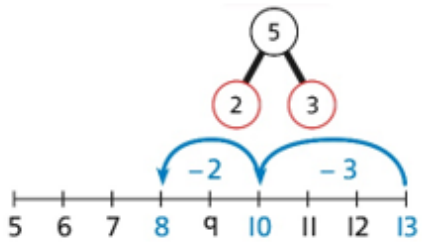
Represent the use of bonds using ten frames.



For 13 – 5, I take away 3 to make 10, then take away 2 to make 8.

Use a number line and a part-whole model to support the method.

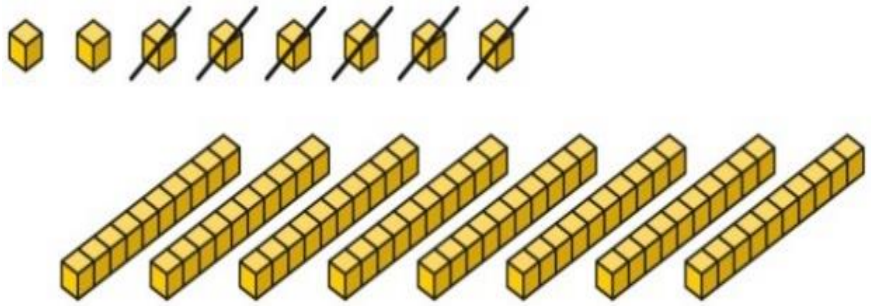
13 − 5

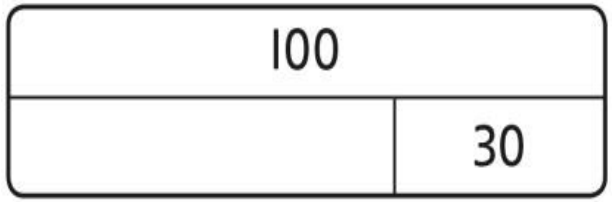


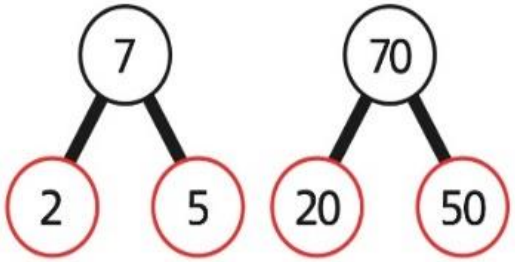
KEY STAGE 1 – YEAR 2

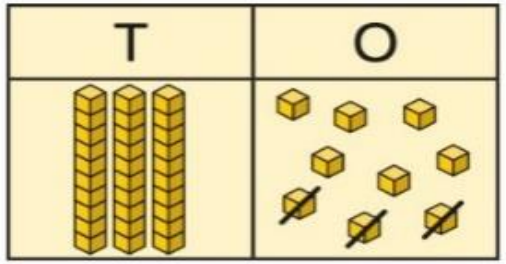
- Pupils should be taught to solve problems with addition and subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their knowledge of mental and written methods.
- Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- Add and subtract numbers using concrete objects, pictorial representations an mentally, including a two digit number and 1's . A two- digit number and 10s, 2 digit numbers and adding 3 one-digit numbers.
- Show that addition of 2 numbers can be done in any order(commutative) and subtraction of 1 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.

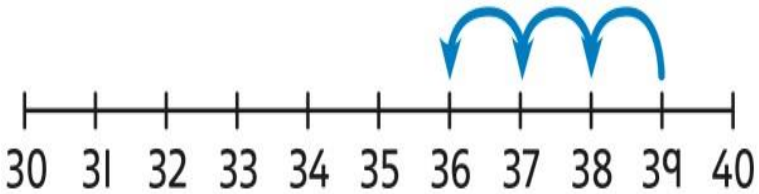
MODELS AND RESOURCES

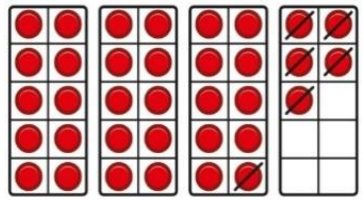






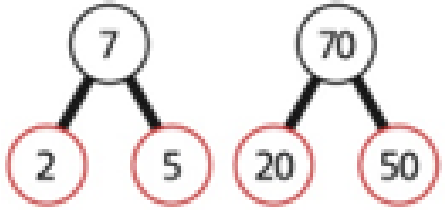






Subtracting multiples of ten

Use known number bonds and unitising to subtract multiples of 10.

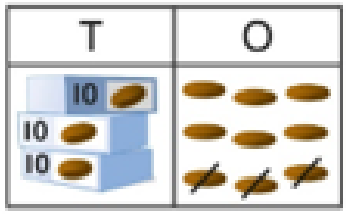


7 tens subtract 5 tens is 2 tens.
70 – 50 = 20

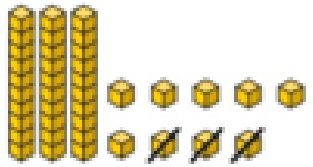
EXAMPLES

Subtracting a single digit number

Subtract the 1s. This may be done in or out of a place value grid.



Subtract the 1s. This may be done in or out of a place value grid.



Subtract the 1s. Understand the link between counting back and subtracting the 1s using known bonds.

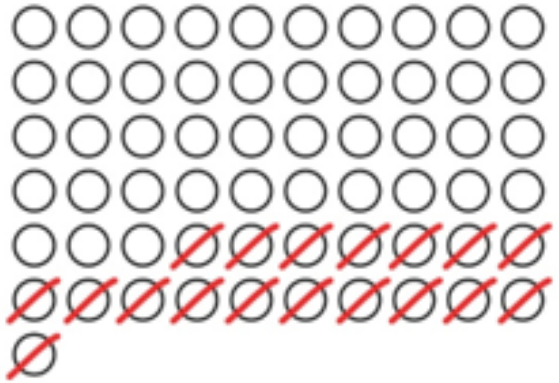
	T	O
	3	9
–		3
	3	6

9 – 3 = 6
39 – 3 = 36

Subtracting a 2-digit number

EXAMPLES

Subtract by taking away.



61 – 18
I took away 1 ten and 8 ones.

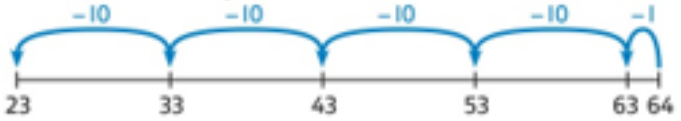
Subtract the 10s and the 1s.

This can be represented on a 100 square.

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

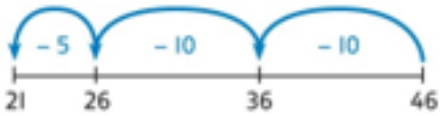
Subtract the 10s and the 1s.

This can be represented on a number line.



64 – 41 = ?

64 – 1 = 63
63 – 40 = 23
64 – 41 = 23

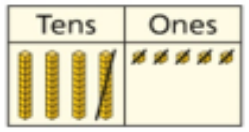


46 – 20 = 26
26 – 5 = 21
46 – 25 = 21

Subtracting two 2-digit numbers with exchanging

EXAMPLES

Subtract the 1s. Then subtract the 10s.



Using column subtraction, subtract the 1s. Then subtract the 10s.

	T	O
	4	5
−	1	2
		3

	T	O
	4	5
−	1	2
	3	3

Exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s.

Using column subtraction, exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s.

	T	O
	4	5
−	2	7

	T	O
	$^{3}\not{4}$	$^{1}5$
−	2	7

	T	O
	$^{3}\not{4}$	$^{1}5$
−	2	7
		8

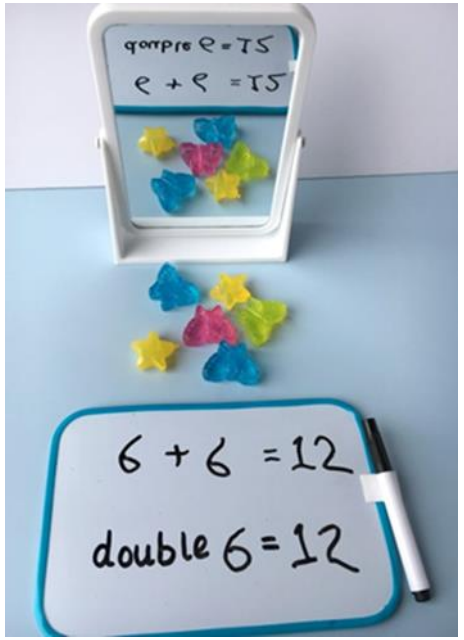
	T	O
	$^{3}\not{4}$	$^{1}5$
−	2	7
	1	8

MULTIPLICATION

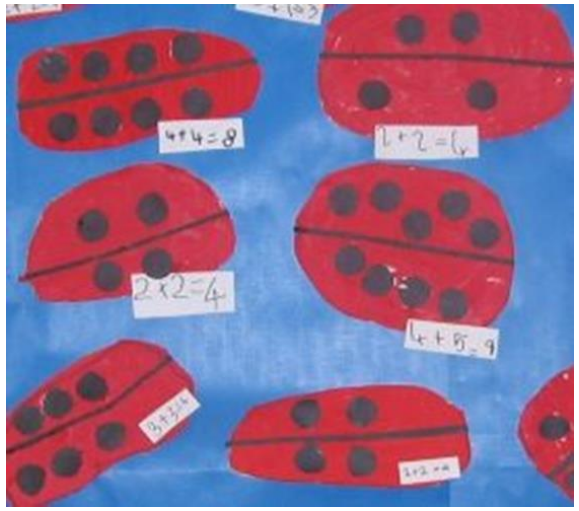
EYFS – RECEPTION

Early learning goals:

- They solve problems, including doubling, halving and sharing.



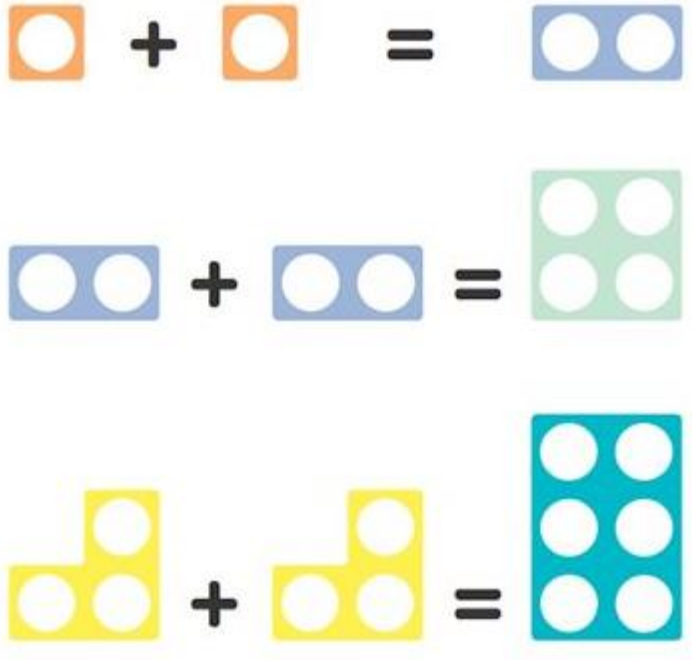
IDEAS AND RESOURCES



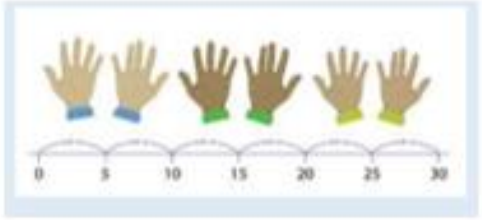
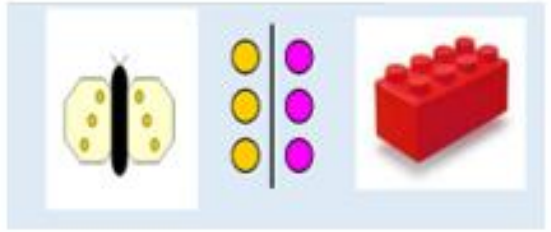
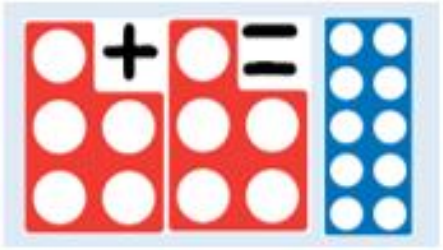
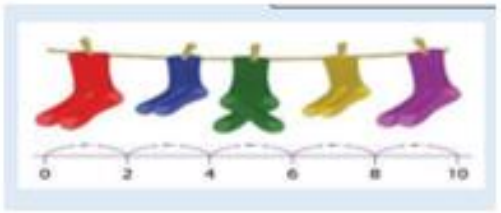
Making pictorial representations

Sorting socks

Doubles with numicon, linking to addition



EXAMPLES

Use pictorial representations and concrete resources to double numbers to 10.	Use concrete sources, role play, stories and songs to begin counting in twos, fives and tens.	Use pictorial representations and concrete resources to halve numbers to 10.	Begin to share quantities using practical resources, role play, stories and songs.
			
The link between addition and multiplication can be introduced through doubling.	'I have 5 pairs of socks on this line. How many socks do I have altogether? '	"I have got a sandwich to share between two people. Can you cut the sandwich in half?"	Sharing model: I have 8 sweets. I want to share them with my friend. How many will we have each?
		Children have a go at recording the calculation that has been carried out: e.g. by drawing pictures in groups or by arranging concrete apparatus into groups.	

KEY STAGE 1 – YEAR 1

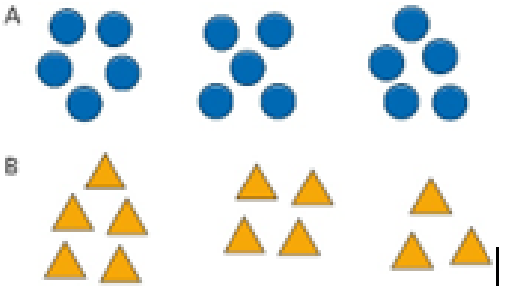
- Pupils should be taught to solve one step problems involving multiplication and division , by calculation the answer using concrete objects, pictorial representations and arrays within the support of the teacher.
- Through grouping and sharing small quantities, pupils begin to understand: multiplication 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 2s, 5s and 10s

EXAMPLES

Recognising and making equal groups

Children arrange objects in equal and unequal groups and understand how to recognise whether they are equal.

Children draw and represent equal and unequal groups.

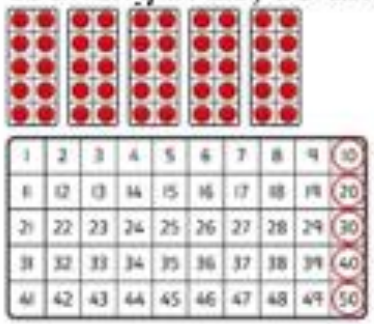


Three equal groups of 4.
Four equal groups of 3.

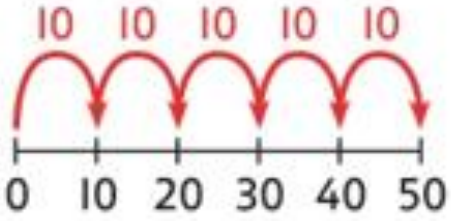
Finding the total of equal groups by counting in 2s, 5s and 10s

There are 5 pens in each pack …
5…10…15…20…25…30…35…40…

100 squares and ten frames support counting in 2s, 5s and 10s.



Use a number line to support repeated addition through counting in 2s, 5s and 10s.



KEY STAGE 1 – YEAR 2

- Pupils should be taught to 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 (x) , division (÷) and equals (=) signs
- Show that multiplication of 2 numbers can be done in any order (commutative) and division of 1 number by another cannot
- Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts.

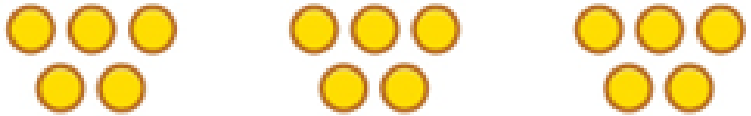
EXAMPLES

Equal groups and repeated addition

Recognise equal groups and write as repeated addition and as multiplication.

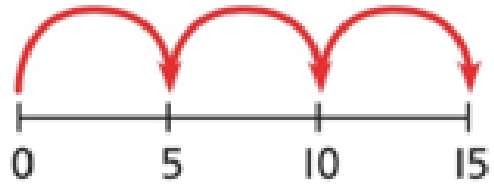
3 groups of 5 chairs
15 chairs altogether

Recognise equal groups using standard objects such as counters and write as repeated addition and multiplication.



3 groups of 5
15 in total

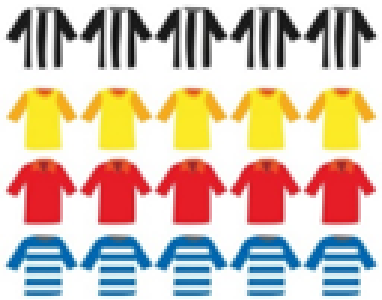
Use a number line and write as repeated addition and as multiplication.



5 + 5 + 5 = 15
3 × 5 = 15

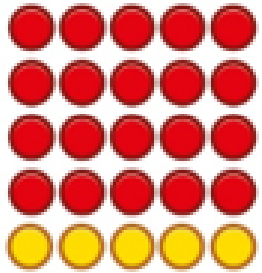
Arrays

Understand the relationship between arrays, multiplication and repeated addition.



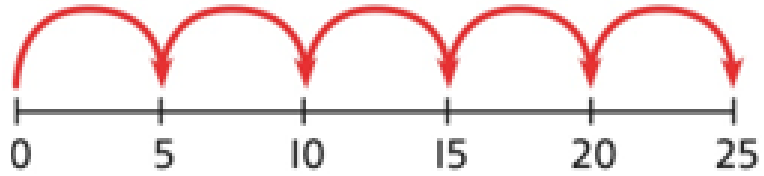
4 groups of 5

Understand the relationship between arrays, multiplication and repeated addition.



4 groups of 5 … 5 groups of 5

Understand the relationship between arrays, multiplication and repeated addition.



5 × 5 = 25

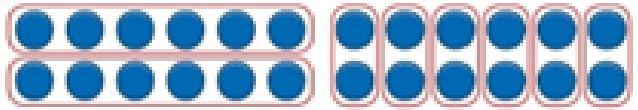
EXAMPLES

Understanding commutativity

Use arrays to visualise commutativity.

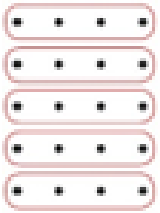
I can see 6 groups of 3.
I can see 3 groups of 6.

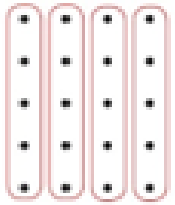
Form arrays using counters to visualise commutativity. Rotate the array to show that orientation does not change the multiplication.



This is 2 groups of 6 and also 6 groups of 2.

Use arrays to visualise commutativity.





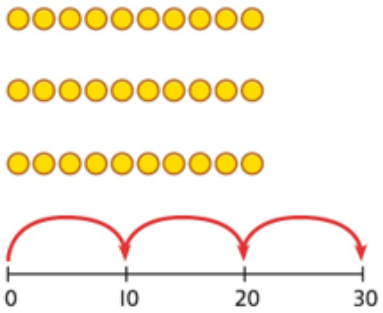
4 + 4 + 4 + 4 + 4 = 20
5 + 5 + 5 + 5 = 20
4 × 5 = 20 and 5 × 4 = 20

2, 5 and 10 times table

Develop an understanding of how to unitise groups of 2, 5 and 10 and learn corresponding times-table facts.

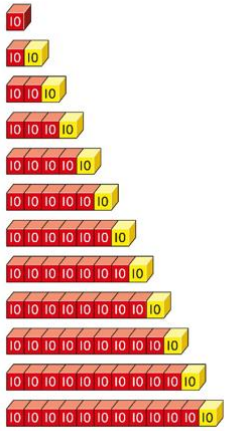
3 groups of 10 … 10, 20, 30
3 × 10 = 30

Understand how to relate counting in unitised groups and repeated addition with knowing key times-table facts.



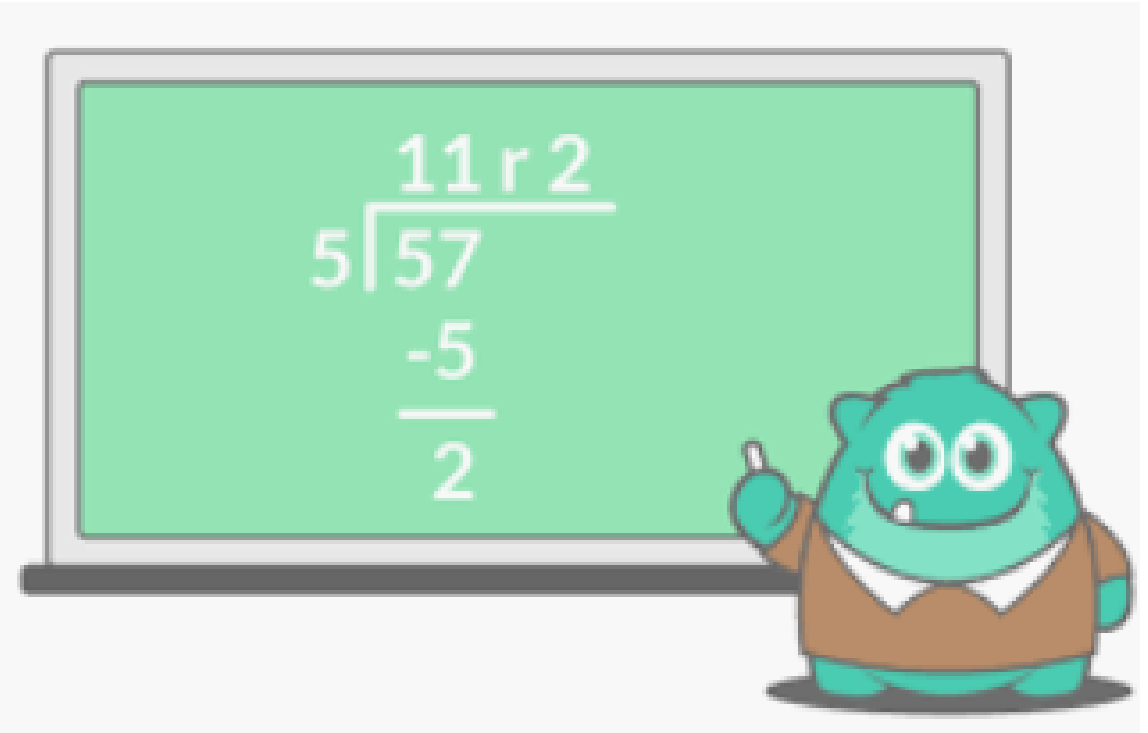
10 + 10 + 10 = 30
3 × 10 = 30

Understand how the times-tables increase and contain patterns.



5 × 10 = 50
6 × 10 = 60

DIVISION



EYFS – RECEPTION

Early learning goals:

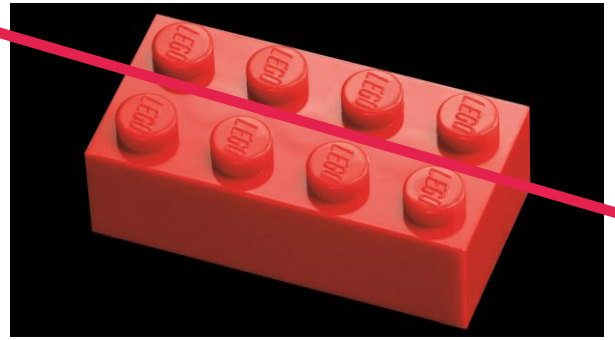
- They solve problems, including doubling, halving and sharing.

IDEAS AND RESOURCES

Sharing out food into groups

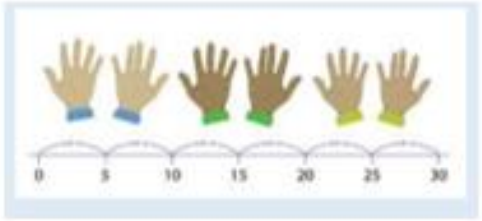
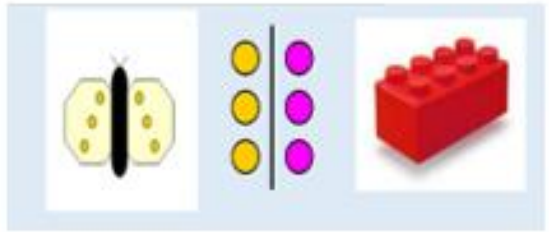
Sorting socks in pairs

Halving activities in pairs



Lego

EXAMPLES

Use pictorial representations and concrete resources to double numbers to 10.	Use concrete sources, role play, stories and songs to begin counting in twos, fives and tens.	Use pictorial representations and concrete resources to halve numbers to 10.	Begin to share quantities using practical resources, role play, stories and songs.
			
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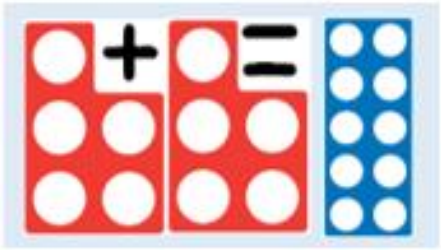	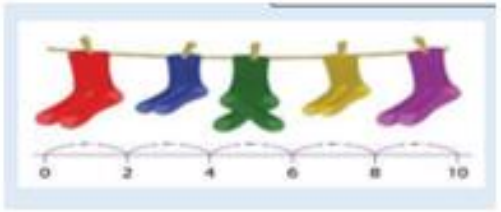	Children have a go at recording the calculation that has been carried out: e.g. by drawing pictures in groups or by arranging concrete apparatus into groups.	

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EXAMPLES

Grouping

Learn to make equal groups from a whole and find how many equal groups of a certain size can be made.

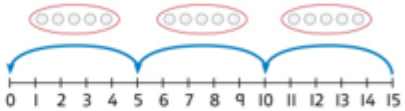
Sort a whole set people and objects into equal groups.

There are 10 children altogether.
There are 2 in each group.
There are 5 groups.

Represent a whole and work out how many equal groups.

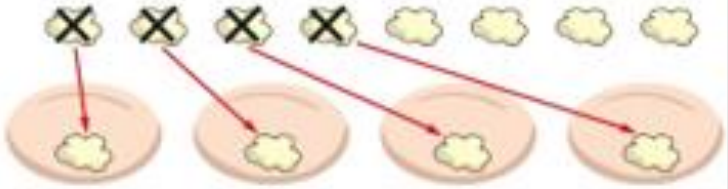
There are 10 in total.
There are 5 in each group.
There are 2 groups.

Children may relate this to counting back in steps of 2, 5 or 10.



Sharing

Share a set of objects into equal parts and work out how many are in each part.



Sketch or draw to represent sharing into equal parts. This may be related to fractions.

10 shared into 2 equal groups gives 5 in each group.

KEY STAGE 1 – YEAR 2

- Pupils should be taught to 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 (x) , division (÷) and equals (=) signs
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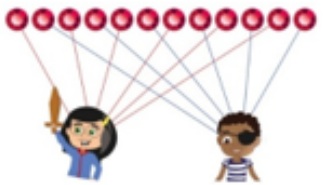
- Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts.

EXAMPLES

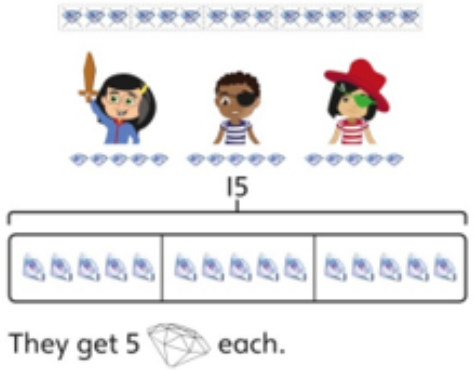
Sharing equally

Start with a whole and share into equal parts, one at a time.



12 shared equally between 2.
They get 6 each.

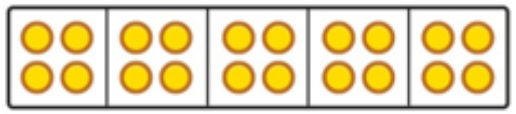
Start to understand how this also relates to grouping. To share equally between 3 people, take a group of 3 and give 1 to each person. Keep going until all the objects have been shared



They get 5 each.

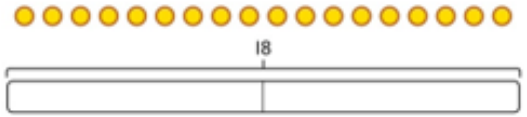
15 shared equally between 3.
They get 5 each.

Represent the objects shared into equal parts using a bar model.



20 shared into 5 equal parts.
There are 4 in each part.

Use a bar model to support understanding of the division.



18 ÷ 2 = 9

EXAMPLES

Grouping equally

Understand how to make equal groups from a whole.

8 divided into 4 equal groups.
There are 2 in each group.

Understand the relationship between grouping and the division statements.

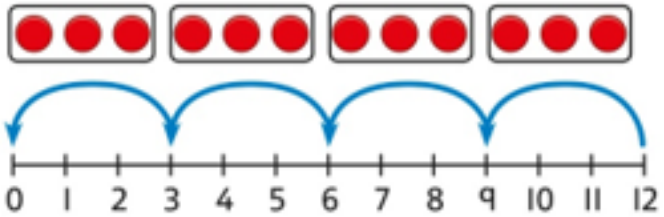
12 ÷ 3 = 4

12 ÷ 4 = 3

12 ÷ 6 = 2

12 ÷ 2 = 6

Understand how to relate division by grouping to repeated subtraction.



There are 4 groups now.

12 divided into groups of 3.
12 ÷ 3 = 4

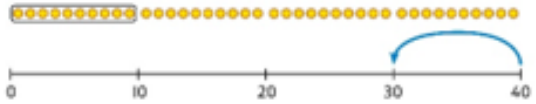
There are 4 groups.

Using known times table to solve divisions

Understand the relationship between multiplication facts and division.

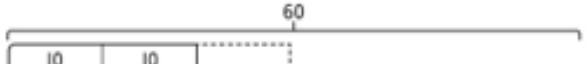
4 groups of 5 cars is 20 cars in total.
20 divided by 4 is 5.

Link equal grouping with repeated subtraction and known times-table facts to support division.



40 divided by 4 is 10.

Use a bar model to support understanding of the link between times-table knowledge and division.



Relate times-table knowledge directly to division.

1 × 10 = 10
2 × 10 = 20
3 × 10 = 30
4 × 10 = 40
5 × 10 = 50
6 × 10 = 60
7 × 10 = 70
8 × 10 = 80

I used the 10 times-table to help me. 3 × 10 = 30.

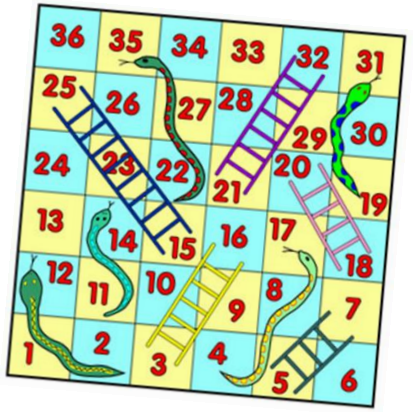
I know that 3 groups of 10 makes 30, so I know that 30 divided by 10 is 3.

3 × 10 = 30 so 30 ÷ 10 = 3

HOW TO SUPPORT YOUR CHILD AT HOME

Real life problems

Learn mathematical vocabulary

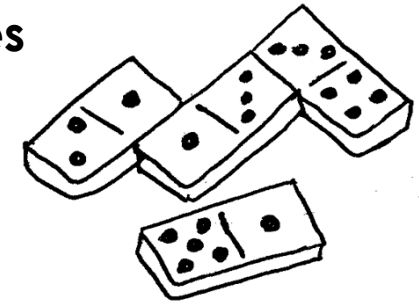


Quick fire questions –Use KIRF (school website)

Online – e.g. Top Marks Maths games, BBc KS1 Bitesize

Counting

Play Games and sing songs



CLASS ROOM RESOURCES

- Please have a look at the resources on the different tables for an idea of the types of equipment we use in each class.
- Please feel free to ask us any questions.
- Please look on the website for Key Instant Recall facts for your year group