# Calculation Meeting

Year 2

+ − x ÷

How do we solve problems?

# Addition

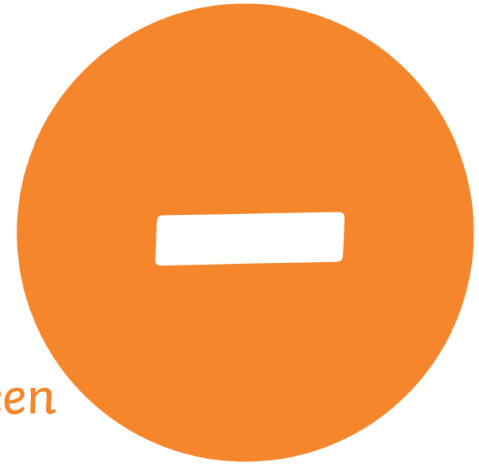
- add
- more
- plus
- make
- sum
- total
- altogether

# Multiplication

- lots of
- times
- multiply
- groups of
- product
- multiplied by
- multiple of
- repeated addition
- array

# Subtraction

- subtract
- minus
- leave
- less
- take away
- difference between



# Division

- divide
- divided by
- divided into
- share
- share equally
- equal groups of

# Aims of the workshop

- For you to have a clear understanding of the methods we teach and why we teach them

- Provide you with some ideas about how to help your child at home

# Year 2 maths curriculum

The national curriculum is broken down into sections

- Number and place value
- Addition and subtraction
- Multiplication and division
- Fractions
- Measurement
- Properties of shapes
- Position and direction
- Statistics

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 1s
- a two-digit number and 10s
- 2 two-digit numbers
- adding 3 one-digit numbers

Show that addition of 2 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.

# Year Two National Curriculum expectation statements for addition, Subtraction, division and multiplication.

Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

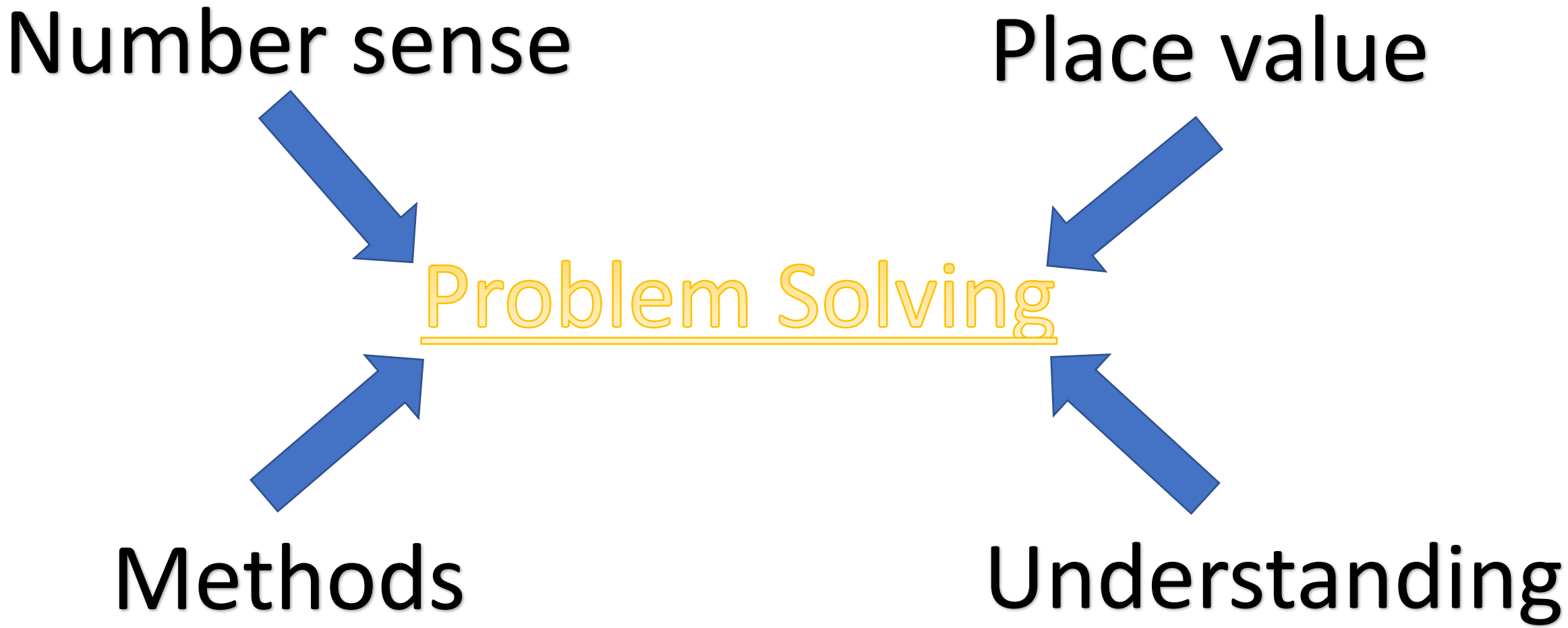
Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs

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.

# The oad to problem solving

Each year we want to build on the children's ability to problem solve and reason mathematically. In order to solve equations/problems these 4 areas are hugely important.



## Number Sense

Number sense skills allow children to work with numbers.

- Understanding concepts like more and less
- Understanding numbers have an order
- Understanding a number is a symbol for an amount
- Being able to compare amounts/numbers

## Understanding

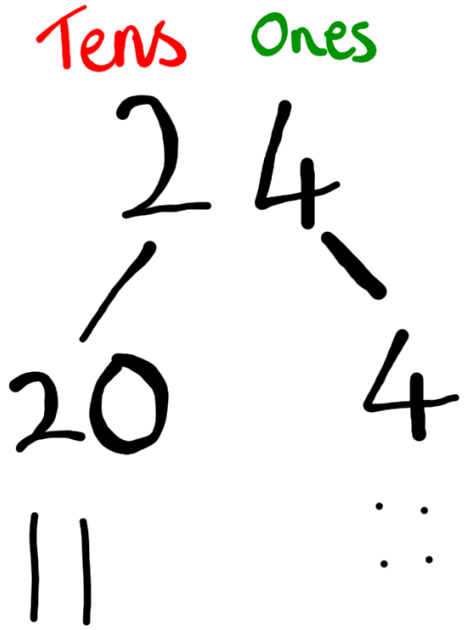
Children need to be able to understand what the question is asking them to do.

- Understand the mathematical symbols - + = x ÷
- Make the link between the symbol and concept, for example + means the number will become greater because we are adding/combining.

## Place Value

Understanding that each number represents an amount. Especially important when using double and triple digit numbers.

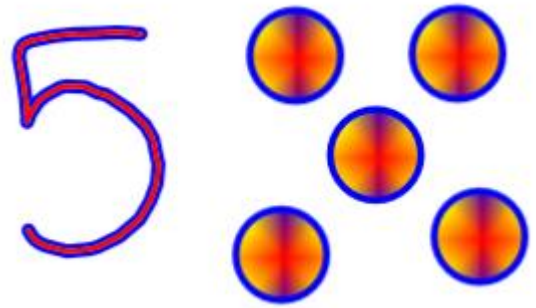
- Understanding how many ones, tens or hundreds are in a number.
- Good place value knowledge will allow children to break down equations and problems into manageable chunks.



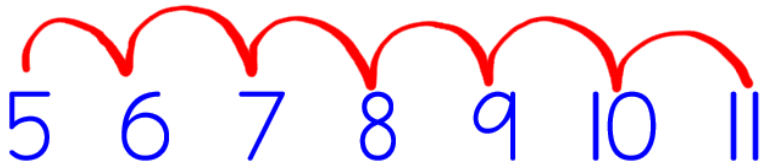

## Methods

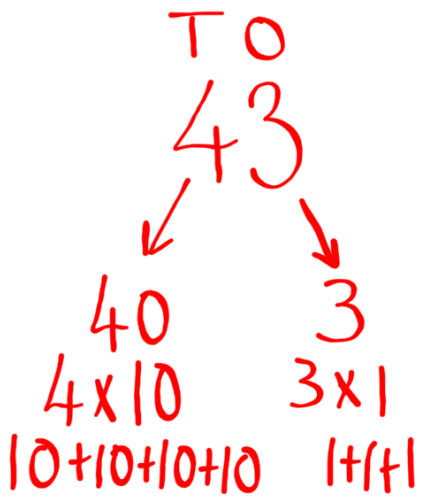
Children need a variety of methods at their disposal. You wouldn't ask them to hammer a nail without a hammer. They need the tools to solve the problem. We'll talk about these in more detail…

# Barriers to learning
# What might be getting in the way?



- Understanding *what* a number really 'is'
- Counting on/back from a given number
- The ability to order numbers
- Knowing 1 more and 1 less
- Knowing 10 more 10 less
- Understanding place value – 100s, 10s and 1s
- Understanding the language – addition, subtract, minus, less etc.



# CPA Approach

We use the CPA approach to teach different methods of problem solving.

CPA stands for: Concrete, Pictorial and Abstract


Objects/things to handle

-Cubes

-Pencils

-10s and 1s

A visual representation

-Drawings

-Bar models

-Arrays

Numbers and symbols

-Equations

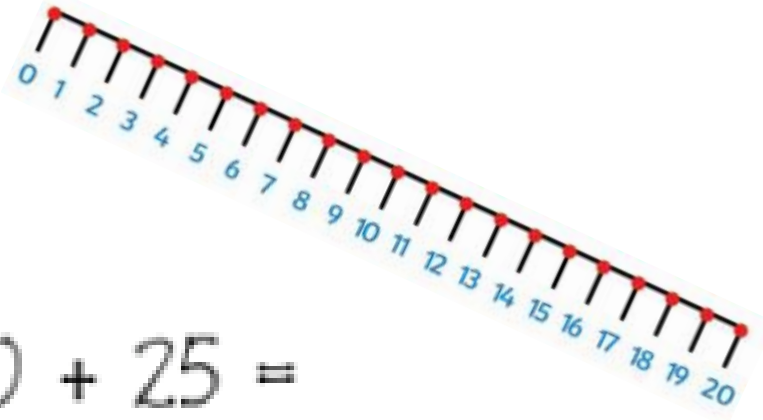
-Operations e.g. + -

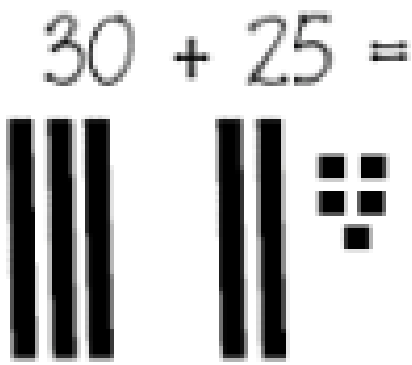
# Addition

Methods we teach

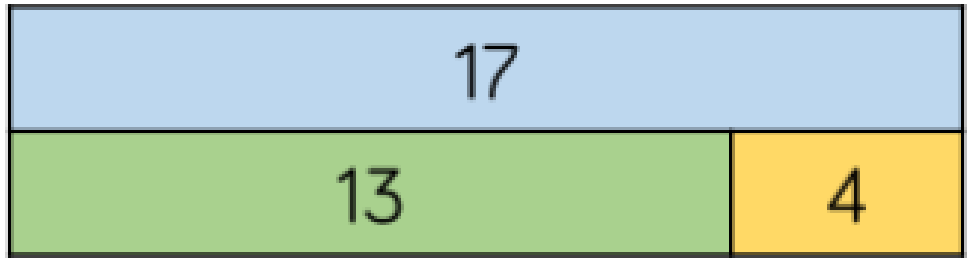
- Number lines
- 100 squares
- Partitioning – Breaking down
- Counting on
- Cubes
- Drawings

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 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 |

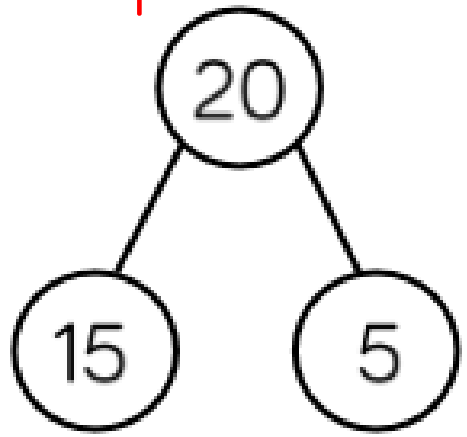



Bar models

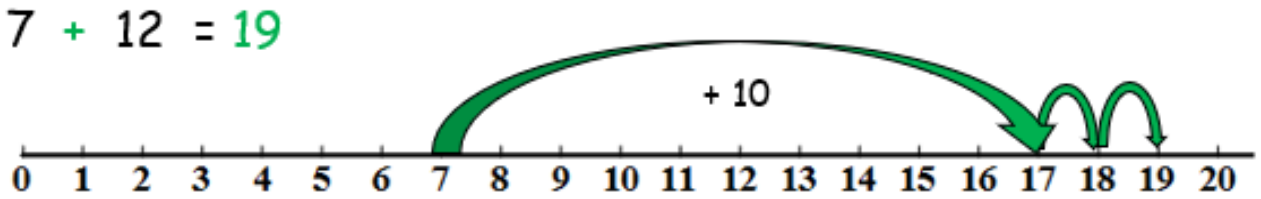


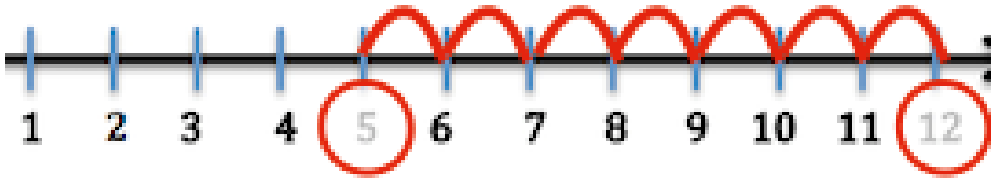

Whole part models



# Addition – Number lines

- Start from the first number
- Work out how many jumps you need to do
- The answer is the number you land on
- Extend to jumps of 10 then 1




**5 + 7 = 12**

# Addition – 100 squares

- Find the first number of the equation
- Count on as many jumps as are in the second number
- Land on and find your answer

- Misconceptions/barriers to learning linked to number

Sense:

- Not being able to recognise and find a number
- Counting the wrong way (wrong direction)
- Not knowing or undesrtanding the order of numbers

14++3=17

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 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 |
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| 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 |

# Can you work out what the equations were / are for the jumps made on these number lines?

| 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 |
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| 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 |

| 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 |
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| 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 |

# Addition – 100 squares

- When adding a number that has tens – Do a jump down, then count on.
- What would the equation be for this?...

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
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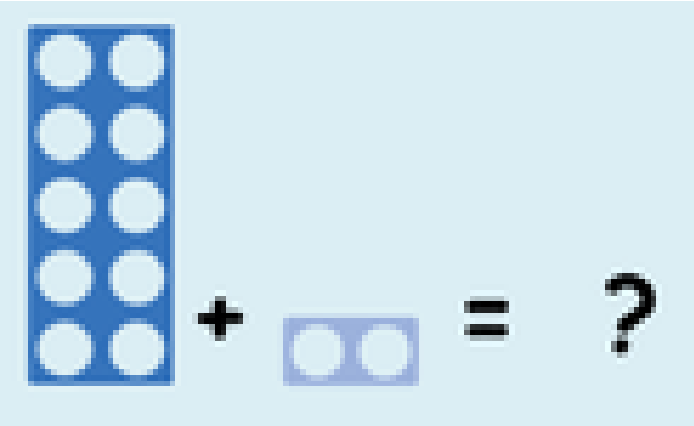
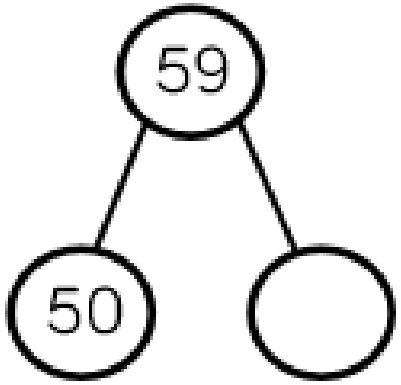
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

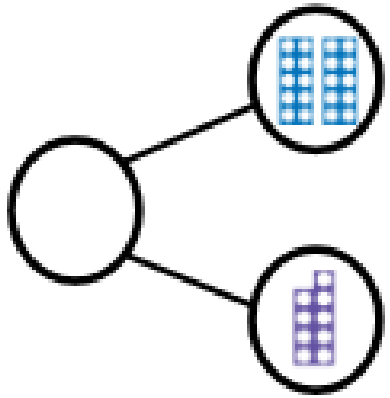
# Addition using concrete and pictorial representations

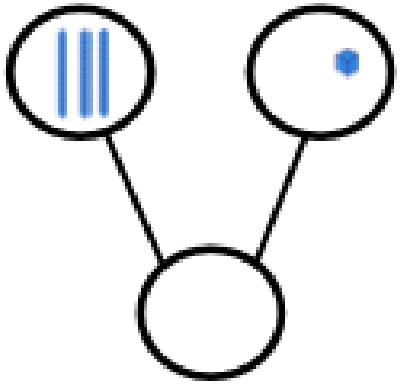
- Cubes, tens and ones, numicon, drawings, whole part models, bar models
- All of these give clear visual representations of numbers
- Whole part and bar models show how two amounts can create a total




Complete the part whole models.





# Addition – Using place value and partitioning

- Break the number down into 10s and 1s.
- Make the equation easier.
- Draw pictorials to aid with understanding.
- Common misconception is to count the 10s as a 1 or vice versa.

45+23=

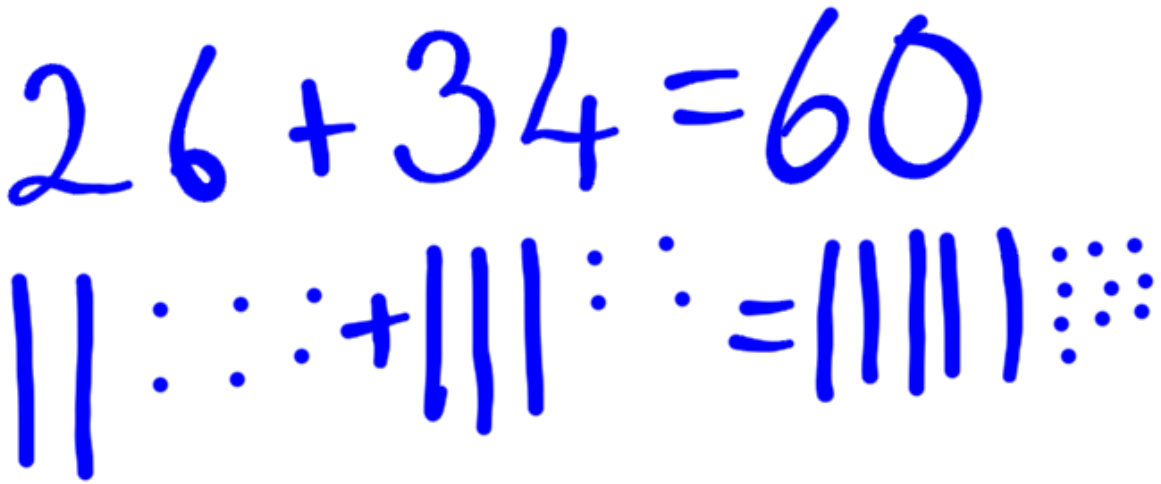
40+20=60

5+3=8

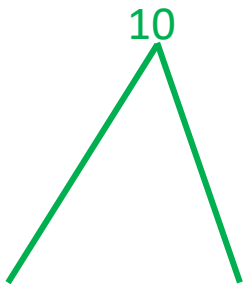
60+8=68

45+3=48

48+20=68



# Other methods




- Finding a 10 4+3+6= 10 + 3 = 13

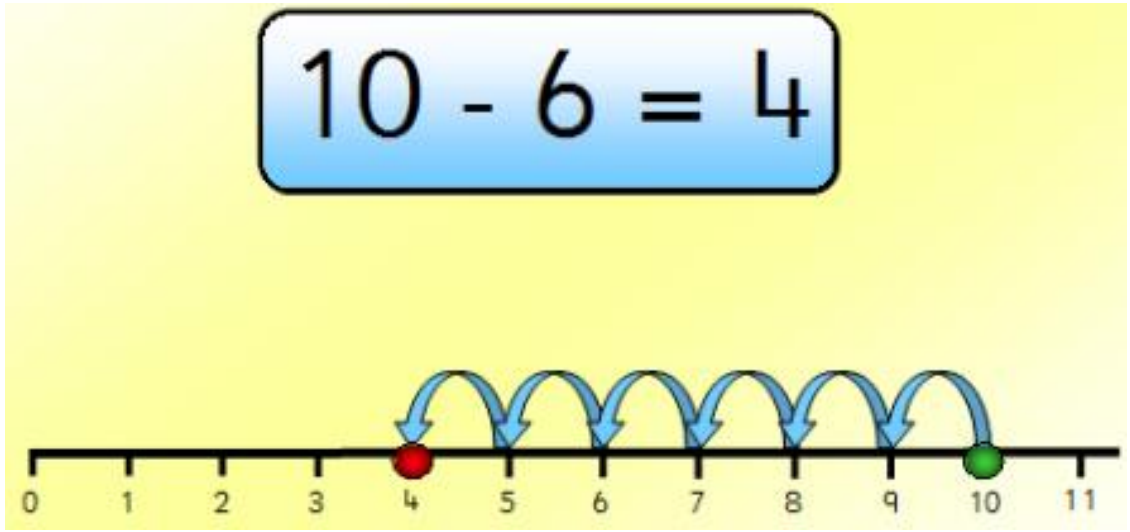
- Near 10s 19+6=

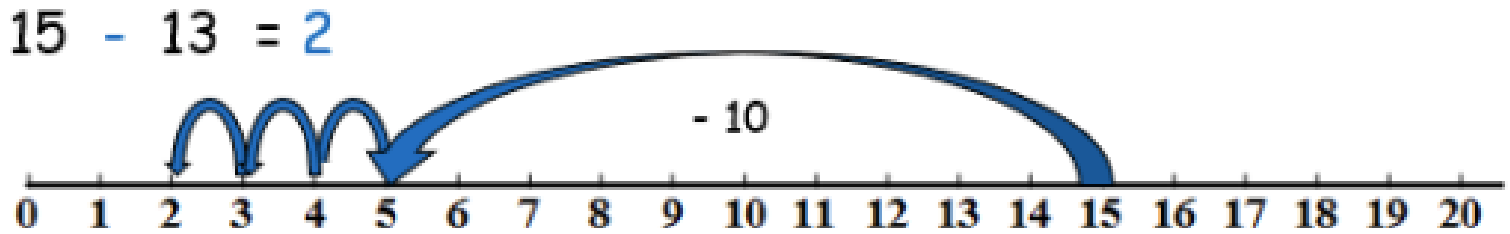
# Subtraction

- Much the same as addition but backwards.
- Children must understand that subtraction will decrease the value of our amount.
- Key language –subtract, minus, take away, less than, fewer

# Subtraction

- Start from greatest number
- Work out how many jumps backwards you will be doing
- Do your jumps
- The answer is the number you land on.



# Subtraction using a 100 square

## Exactly the same as before but going backwards

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
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| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
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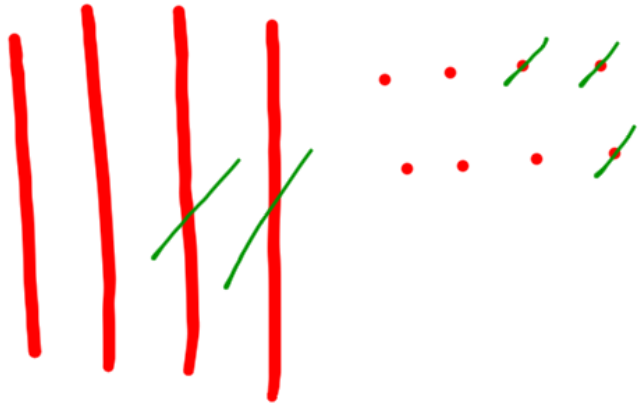
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

# Subtraction using drawings

- Draw the total or first number
- Cross out how many we are subtracting



$48 - 23 = 25$

$25 + 23 = 48$

$48 = 25 + 23$

# Subtraction using place value and partitioning

- Use place value to make the equation easier.
- Take away the ones first then 10s – Or the other way around depending on which they find best.

28-14=

28-4=24

24-10=14

**We do not teach column method.**

Subtraction equations like the one below are the toughest to grasp. The ones are greater in the second number so children cannot draw lines and dots then cross out without converting.
The two methods we teach are,
1. Subtract the ones or 10s first, then the other
2. Convert a ten into 10 ones – This gives a clear visual representation of how column method works.

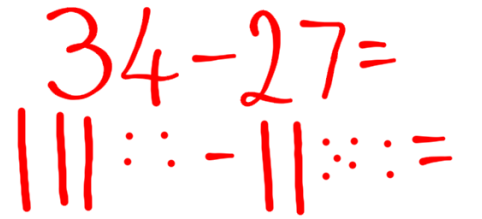
1.

34-27=

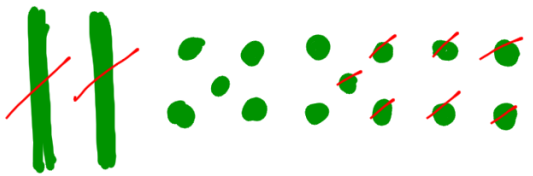
34-7=27

27-20=7

2.




As you can't subtract 7 from 4 lines and dots wont work without converting/exchanging. Convert/exchange a ten from 34 into 10 ones, then cross out like normal.

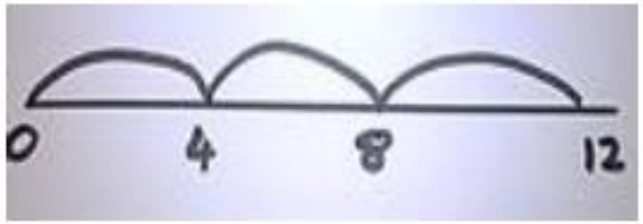


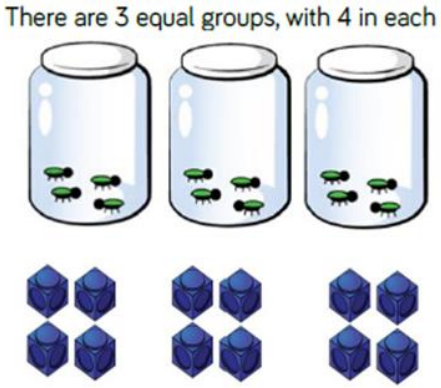
# Multiplication

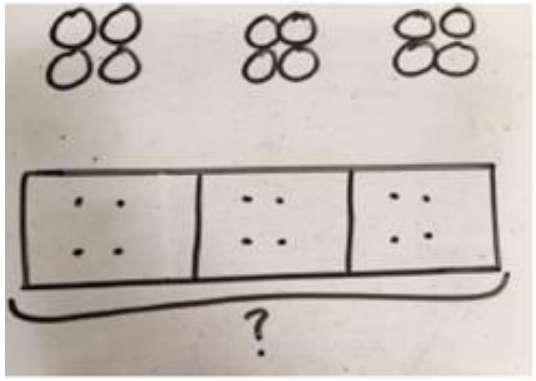
Repeated addition 4+4+4+4+4+4=24

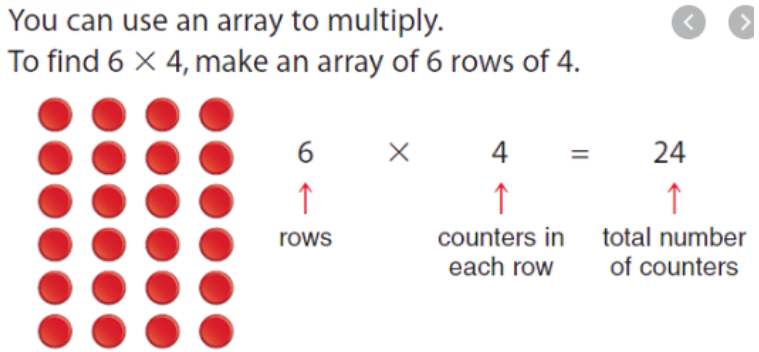
- 'Groups of' or 'lots of' the same number.
- Can be represented as an array, repeated addition or by drawing groups using dots and circles (Linked to division).
- Understanding it is commutative (the numbers can be moved or swapped around)

3 × 4 = 12



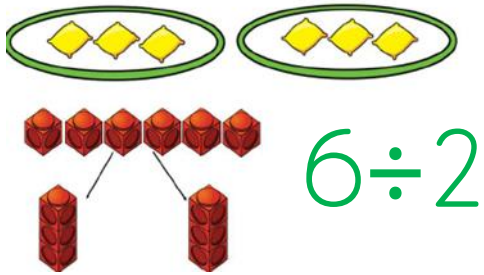



# Division

- Sharing a number into groups.
- Share the greater number.
- Smaller number – that's how many groups you'll have.



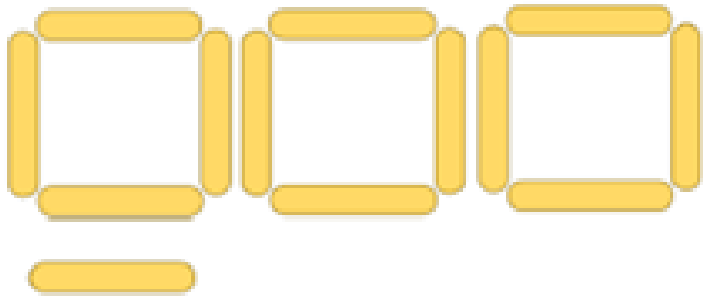
6÷2=3

Link division to multiplication by creating an array and thinking about the number sentences that can be created.

E.g. 15÷3=5, 15÷5=3, 5x3=15, 3x5=15

# Division with remainders

Use of lollipop sticks to form wholes- squares are made because we are dividing by 4.



There are 3 whole squares, with 1 left over.

What equations could you write from this investigation?

# Extra learning

- KIRF homework – Sent home each half term to reinforce quick recall facts to support learning
- Mathletics – if you have not given consent for this, please email Miss Rae on the school email address
- Maths challenges – these are available on the home page of the website. They are designed for the children to investigate and 'draw' their thinking to get to the answers
- Purple mash games – please email the Year Two email address if your child does not have a login for purple mash.

If you have any further questions, please email your child's teacher via the Year Two email address