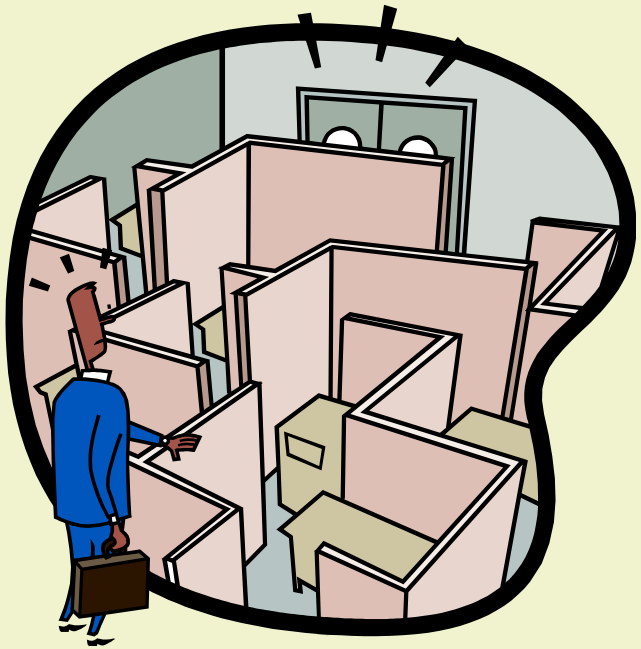
Maths

- How do we teach it?
- Why do we teach it like that?
- What do the written methods look like?
- What can you do at home to help?

‘It just doesn’t look like it did in my day.’



‘I hear and I forget. I see and I remember.
I do and I understand.’
(A Chinese proverb)

Previously (in our time!), maths was taught using Victorian era methods.

Were you one of the lucky ones?

Logical and strong with numbers?

Do we all need to be able to work out **27 x 43** precisely with a pen and paper?

Probably not...but we do need to know that:

27 x 43 is roughly 30 x 40 and...

that this is roughly 1,200

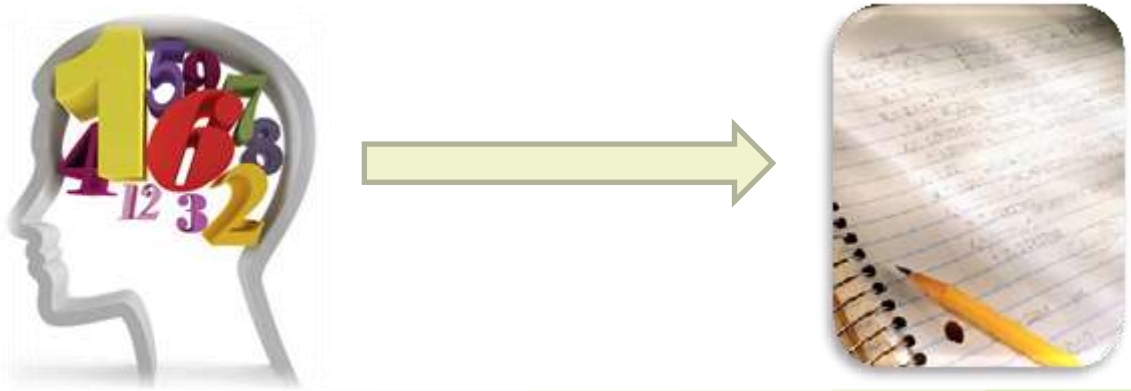
It's partly the need to have a good feel for numbers that is behind the modern methods.

The Aim

- for children to do mathematics in their heads, and if the numbers are too large, to use pencil and paper to avoid losing track.
- To do this children need to learn quick and efficient methods, including mental methods and <u>appropriate</u> written methods.

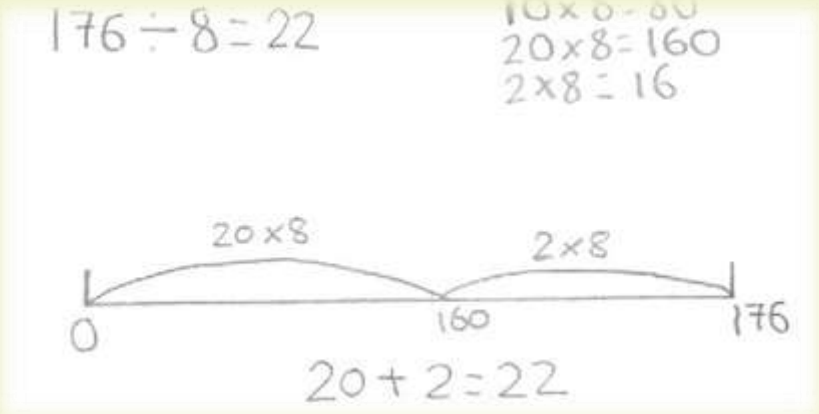
Learning written methods is not the ultimate aim.

Mathematics is foremost an activity of the mind; written calculations are an aid to that mental activity.



We want children to ask themselves:

1. Can I do this in my head?
2. Can I do this in my head using drawings or jottings?
3. Do I need to use an expanded or compact written method?
4. Do I need a calculator?



First steps in Maths

- We all think differently and maths is no exception. We arm the children with a variety of methods of calculating and then encourage them to explore what works best for them

- We place great emphasis on mental calculation strategies and we aim for the children to be able to understand and use their mental calculation strategies in order to progress towards written methods, firstly informal, then more formal as their knowledge and understanding develops

- The ability to calculate mentally forms the basis of all calculations and therefore, up until the end of Year 3, the focus in class is on teaching these mental methods.

-

What's next?

- It is only once the children are confident in these mental strategies that they begin to look at more formal written methods.

- As they move through KS2, the children are taught a number of techniques, initially expanding on their mental strategies before progressing towards an efficient and more compact written method.

Step 1

Oral and mental skills are practised, rehearsed and built on in all year groups.

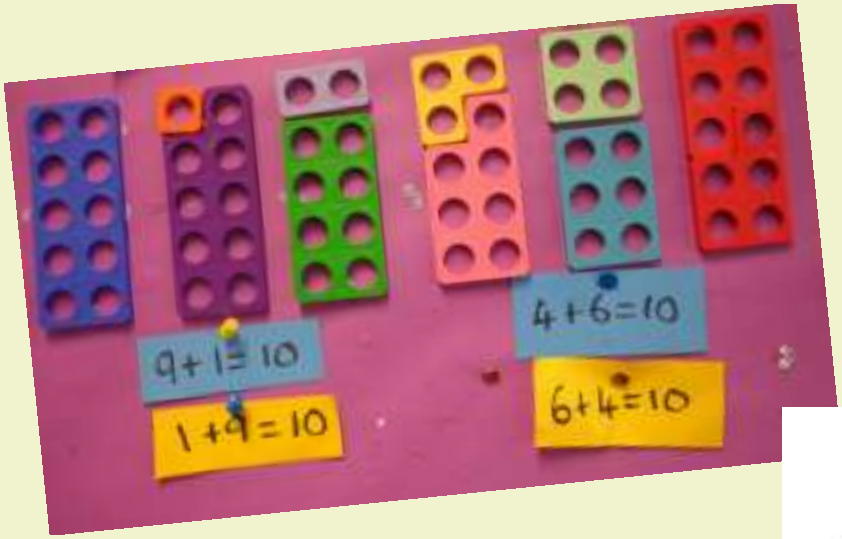
In the very early years, the focus is on developing an understanding of numbers. We start by teaching the children to count on and back, at first with their fingers, then with number lines and hundred squares. They will do lots of practical activities which involve counting objects and will learn about the terms 'more' and 'less'.

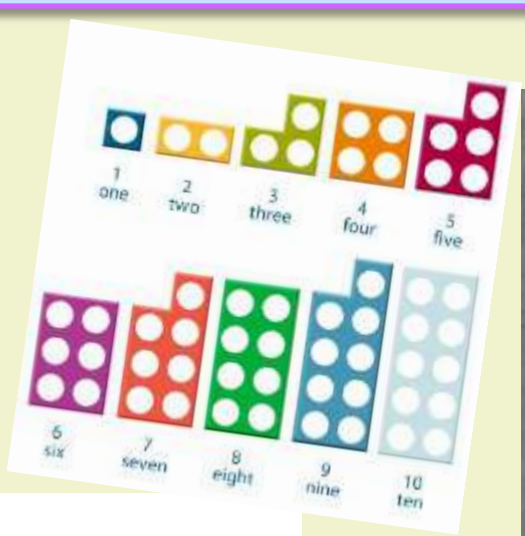
Step 2

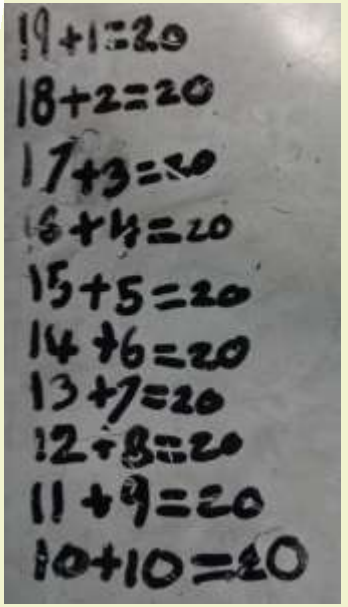
Once children have gained an understanding of what numbers actually are, the focus becomes number bonds to 10 and then 20 (e.g. 1 + 9; 2 + 8; 6 + 4 etc.)

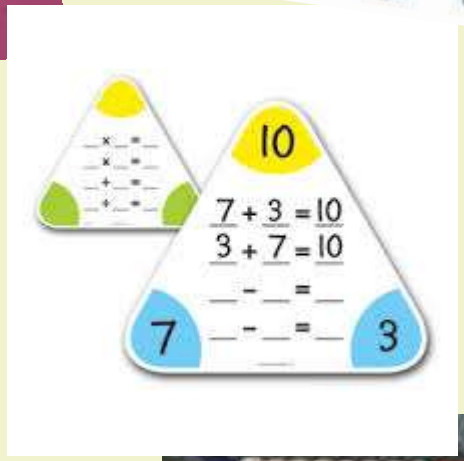
Again, this is taught using a variety of practical methods until the children are confident enough to do them mentally.

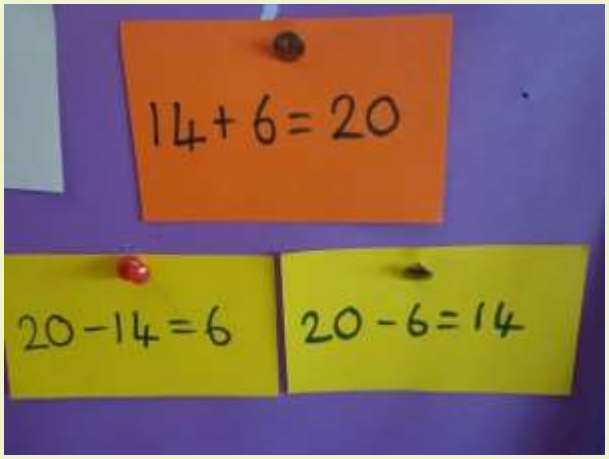
Number Bond Activities

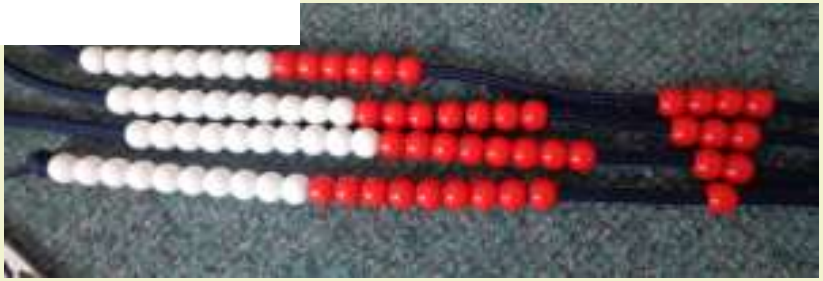












Games

The Prism Number Bonds Game

How to play:

You will need:

- a number track
- a die
- a counter each

Roll the dice. Decide which number you would add to the number on the dice to make 10. Then move that many spaces around the track.

The winner is the first person to get to the finish.

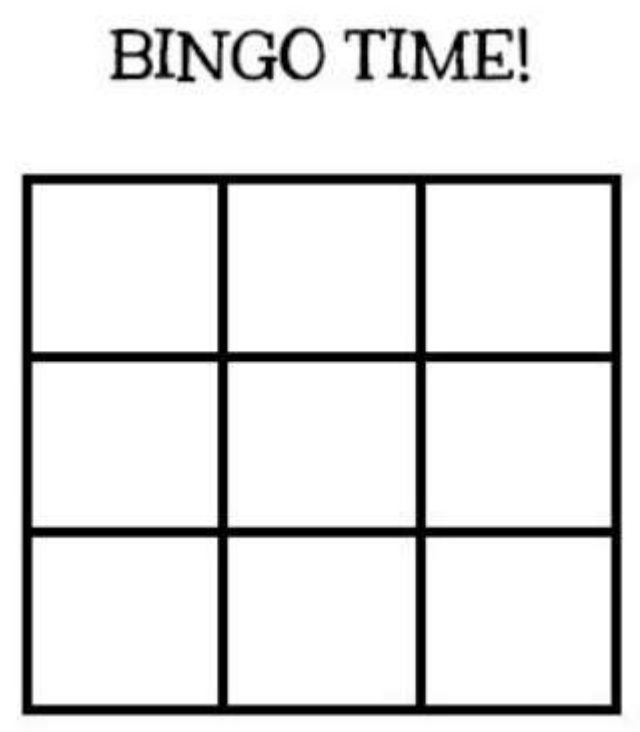
Now try playing the game with a dice with larger numbers on it.

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

Games

Using 10 beans/counters/coins

Chuck them in the air and when they land, group the colours as they land to generate pairs to 10.



Games

Playing cards 1-10

Have a bingo-type board with assorted numbers to 10. Take turns to turn over a card. Child says what goes with it to make 10 and if they have that number on their bingo card they cover it up. If they haven't, or it's already covered they lose that turn. Winner is first person to cover their board

How many can they do in 1 minute?
Try to beat their record each time.

Games

Ping Pong!

You begin by setting a rhythm where one person, i·e· the adult says ping and the children reply pong· You then start to give a number in place of ping and the children have to give the complement to 10 in place of pong, so it would go something like this 'ping, pong, ping, pong, six, four, ping, pong, five, five' etc·

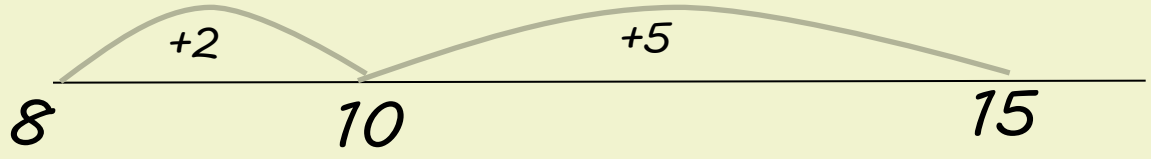
Children really enjoy it and can actually hear themselves getting quicker at responding·

Step 3

Children need to be able to recall other simple addition facts such as 4 + 5 and 8 + 9 and relate this to multiples of 10 and 100 (e.g. 40 + 50; 80 + 90).
These are secured through sufficient practice.

When learning to add numbers such as 8 + 7 or 26 + 7, they will learn to 'bridge through 10' to make adding quicker and more efficient. So they will make the first number add to the next 10, then add on what's left. For example,

For 8 + 7, they will do 8 + 2 = 10,
then add on the rest: + 5 = 15.



Dice Games

Don't Roll 1:

Aim is to reach 100 - 2 or more players, 2 dice or more!
- could be practising adding small numbers, doubles, bonds etc.

Odds and Evens:

Aim is to reach 50 - 2 players, 2 dice.
Decide who is 'Odd' and who is 'Even'
Each player rolls a dice, add the 2 numbers together. Decide whether total is odd or even. If it is odd, that number goes to the 'odd' person; if it is even it goes to the 'even' person. Both players roll again and repeat the process. Keep a running total until one player reaches 50.

Three in a Row

Aim is to make a row of three counters on a 6x6 multiplication grid. 2 players, 2 dice, lots of counters/coins.
Roll both the dice and multiply numbers together.
Put a counter on the answer (eg: if 2 and 3 were rolled, a counter could be placed on any 6)
Next player has a turn and play continues until one player gets 3 in a row (horizontally,vertically or diagonally).

	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	4	6	8	10	12
3	3	6	9	12	15	18
4	4	8	12	16	20	24
5	5	10	15	20	25	30
6	6	12	18	24	30	36

Hundred Square

-1

+1

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

+ 10

Addition

Subtraction

Multiplication

Division

33 + 20 = 53

Step 4

It is also crucial that children gain an understanding of place value (how much each digit in a number is worth) and how to partition a number into ones (units), tens, hundreds etc. This helps the children manage the calculation more easily.

For example:

23 + 46

can be broken down into:

20 + 40 = 60

3 + 6 = 9

60 + 9 = 69

They can then use their knowledge of place value to extend known number facts – e.g. using the fact that 3 x 6 = 18 to calculate 30 x 6 = 180.

Let's do some Maths!

ADDITION

Key Words

total come increase

both altogether

sum plus combine

in all add join

How would you solve these?

- 25 + 42
- 25 + 27
- 25 + 49
- 78 + 199
- 145 +127

A sledgehammer to crack a nut!

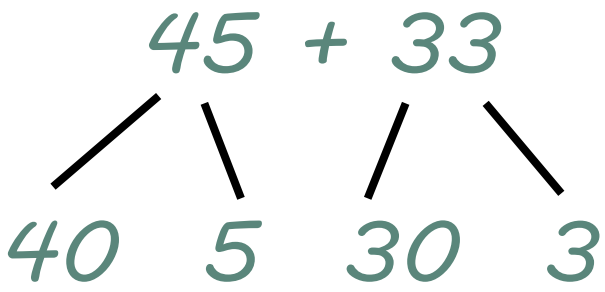
$$\begin{array}{r} {}^{0}\cancel{1}\,{}^{1}\cancel{0}\,{}^{9}\cancel{0}\,{}^{1}\cancel{0} \\ -\quad 7 \\ \hline 993 \end{array}$$

$$\begin{array}{r} {}^{1}\cancel{1}6^{\,0} \\ -\ 9 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 97 \\ \times\ 100 \\ \hline 00 \\ 000 \\ 9700 \\ \hline 9700 \end{array}$$

$$7\overline{)\,{}^{0}\cancel{5}\,6}\quad 08$$

Stage 1: Partitioning



40 + 30 = 70

5 + 3 = 8

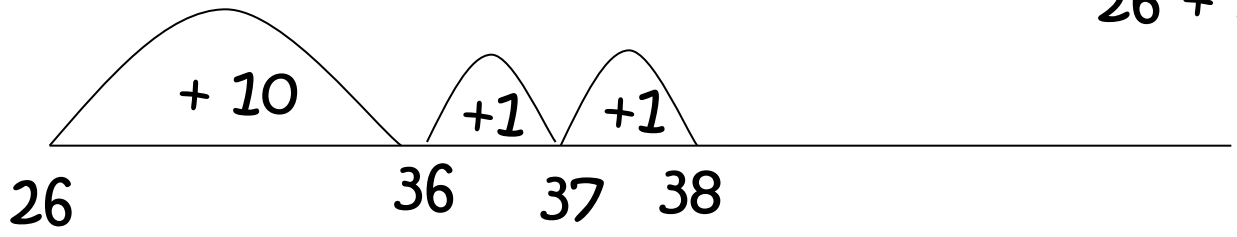
70 + 8 = 78

Your turn...

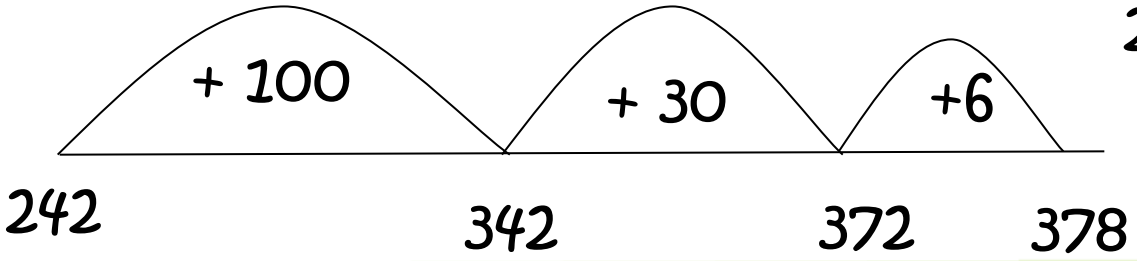
53 + 46 =

Stage 2: Number line

26 + 12 = 38

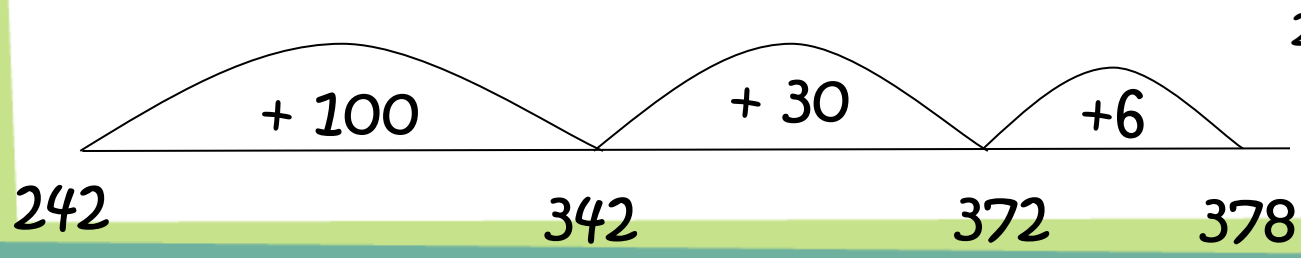


242 + 136 = 378



Use the number line to work these out...

- 67 + 48 =
- 346 + 237 =
- 3241 + 1471 =



242 + 136 = 378

SUBTRACTION

Key Words

Take away

decrease

remain

difference

minus

How many more?

fewer

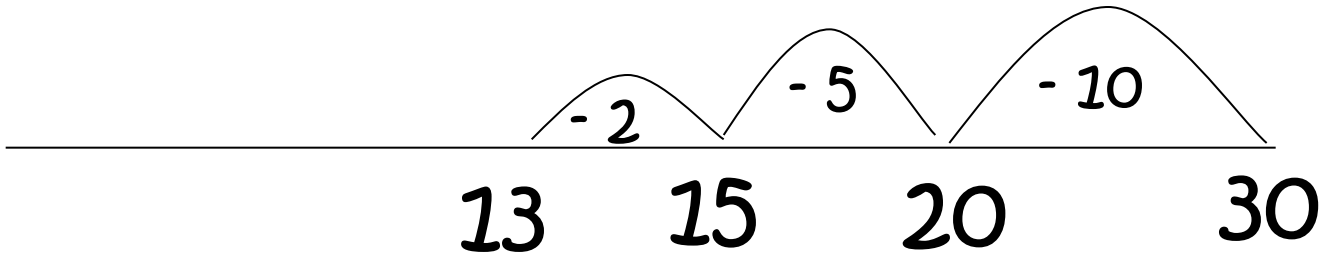
left

How would you solve these?

- 67 - 45
- 67 - 59
- 178 - 99
- 3241 - 2167

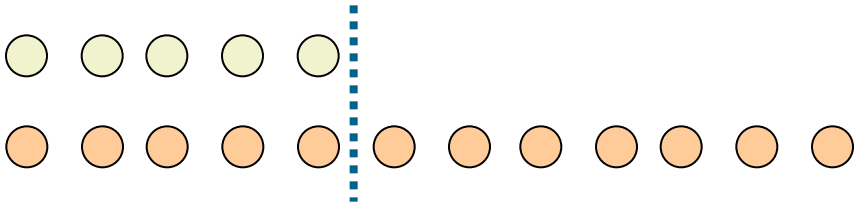
Stage 1: Number line

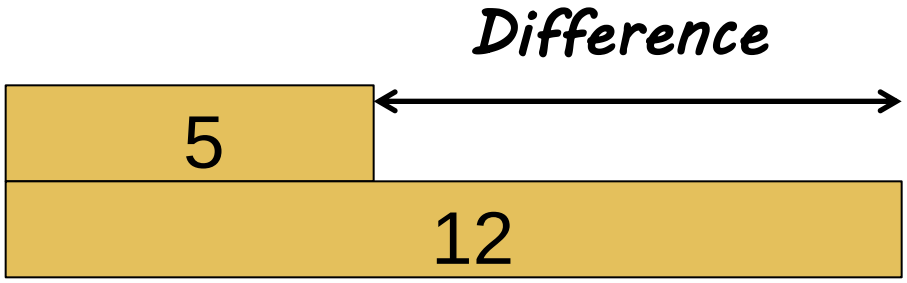
- Subtraction as taking away



30 – 17 = 13

- Subtraction as finding the difference

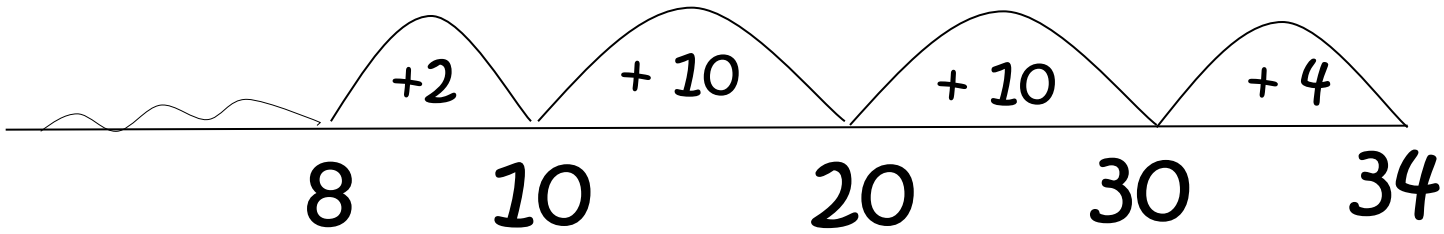




Stage 2: Number line

- Subtraction as finding the difference

34 – 8 =

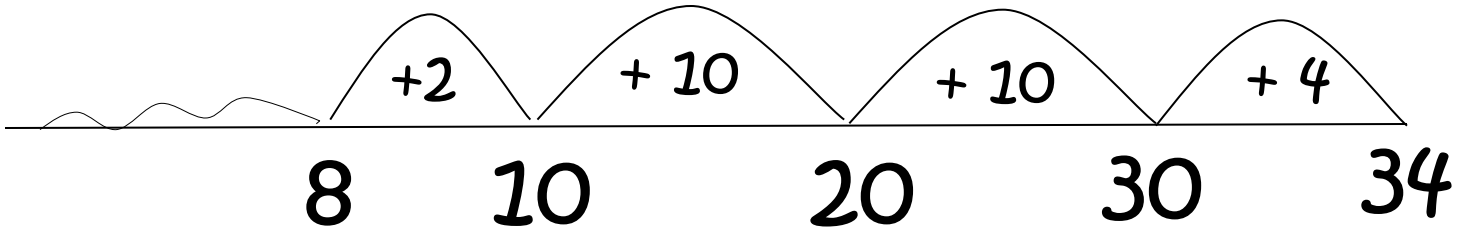


- Jump to next multiple of 10
- Count the jumps

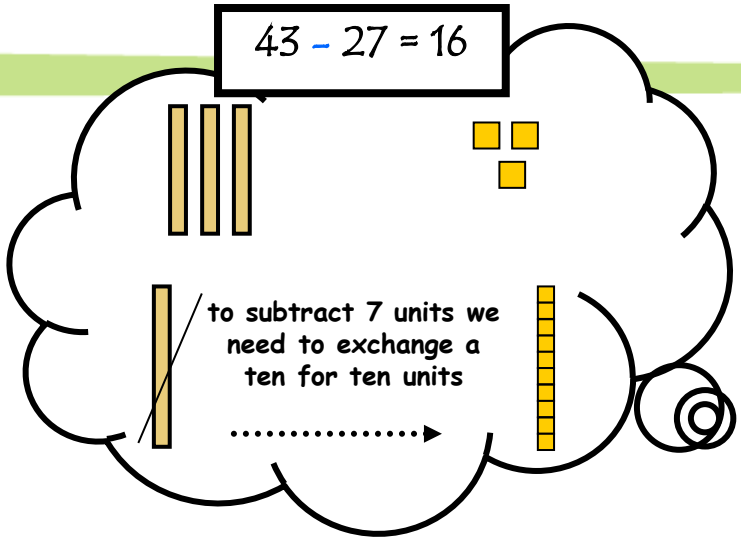
10 + 3 = 13

Use the number line to work these out...

- 48 - 31 =
- 256 - 107 =



Stage 3: Expanded Column Method



Expanded method

It is important that the children have a good understanding of place value and partitioning using concrete resources and visual images to support calculations. The expanded method enables children to see what happens to numbers in the standard written method.

T	U
4	3
– 2	7

$$\begin{array}{rrcr} {}^{30}\cancel{40} & & + & {}^{10+}3 \\ - & 20 & + & 7 \\ \hline & 10 & + & 6 \end{array}$$

Multiplication

per

of

multiplied

product

twice

double

by

as much

times

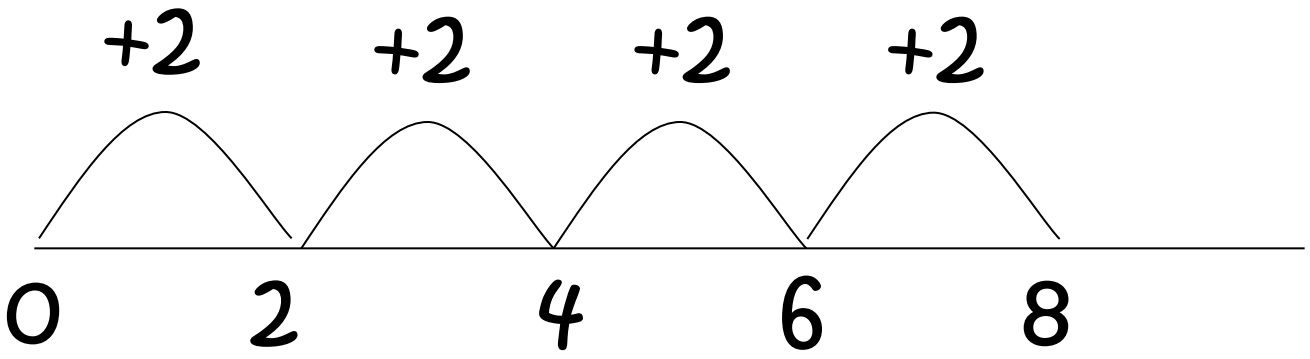
How would you solve these?

- 24×50
- 24×4
- 24×15
- 136×9

Stage 1: Number line

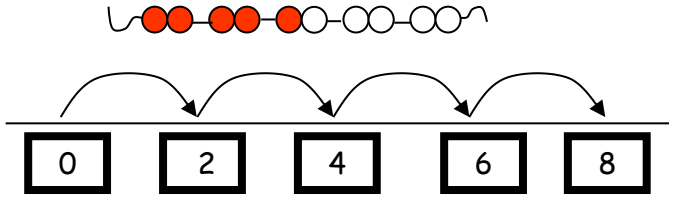
Multiplication as repeated addition

4×2



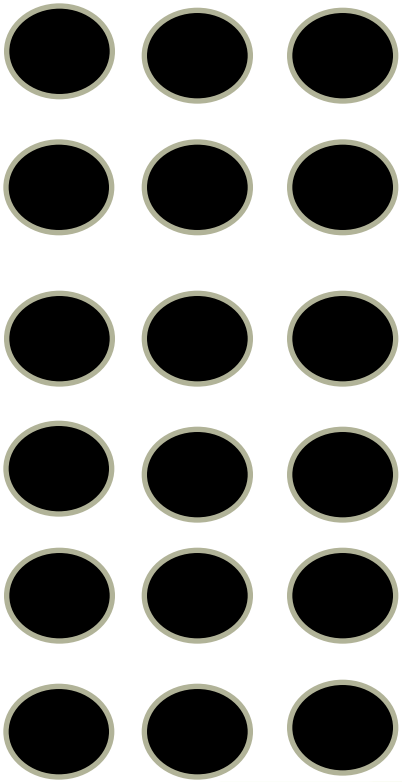
$4 \times 2 = 2 + 2 + 2 + 2$

So, $2 \times 4 = 8$

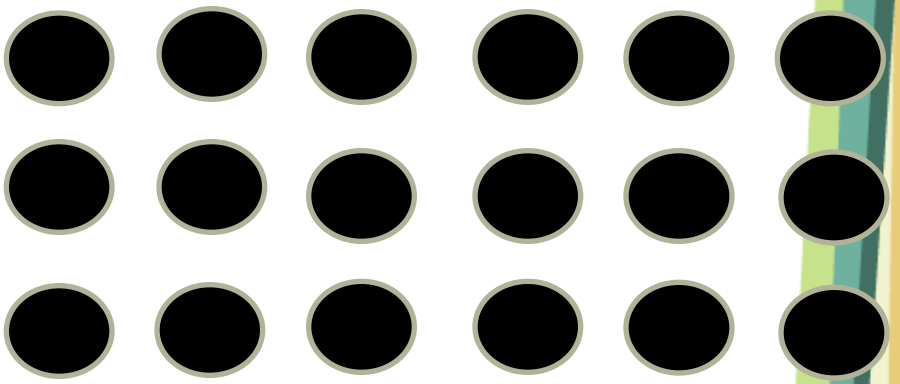


Stage 2: Arrays

3 x 6



Or



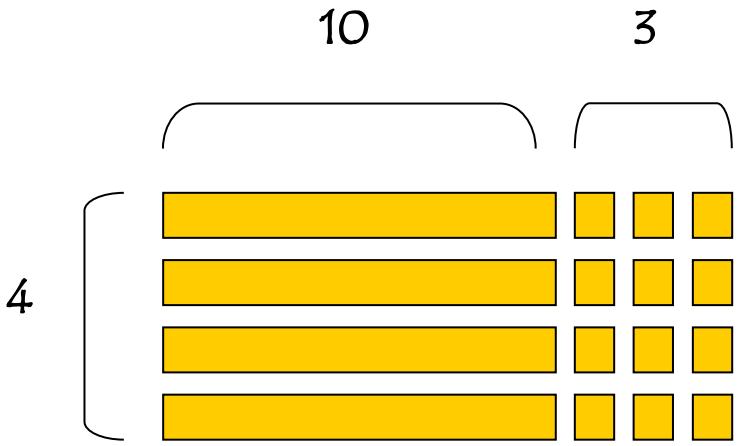
Add the dots

What multiplication are these arrays showing?

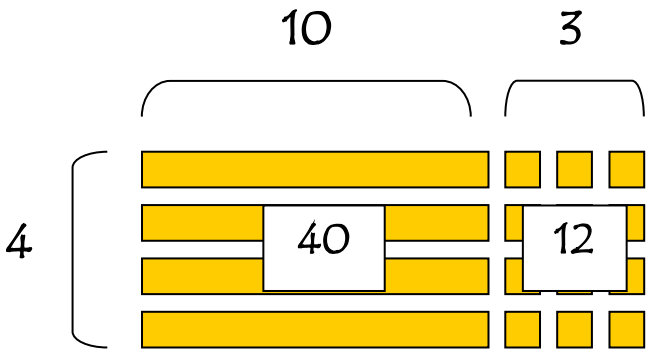
Stage 3: Partitioning

Use place value apparatus to support the multiplication of U x TU

4 x 13



Stage 3: Partitioning



4	10	3
	40	12

40 + 12 = 52

Use place value apparatus to support the multiplication of U x TU alongside the grid method

4 x 13

Stage 3: Partitioning

24 x 5

20 x 5 = 100
4 x 5 = 20

100 + 20 = 120

Step 4: Grid Method

Multiplying TU x TU

14 x 33

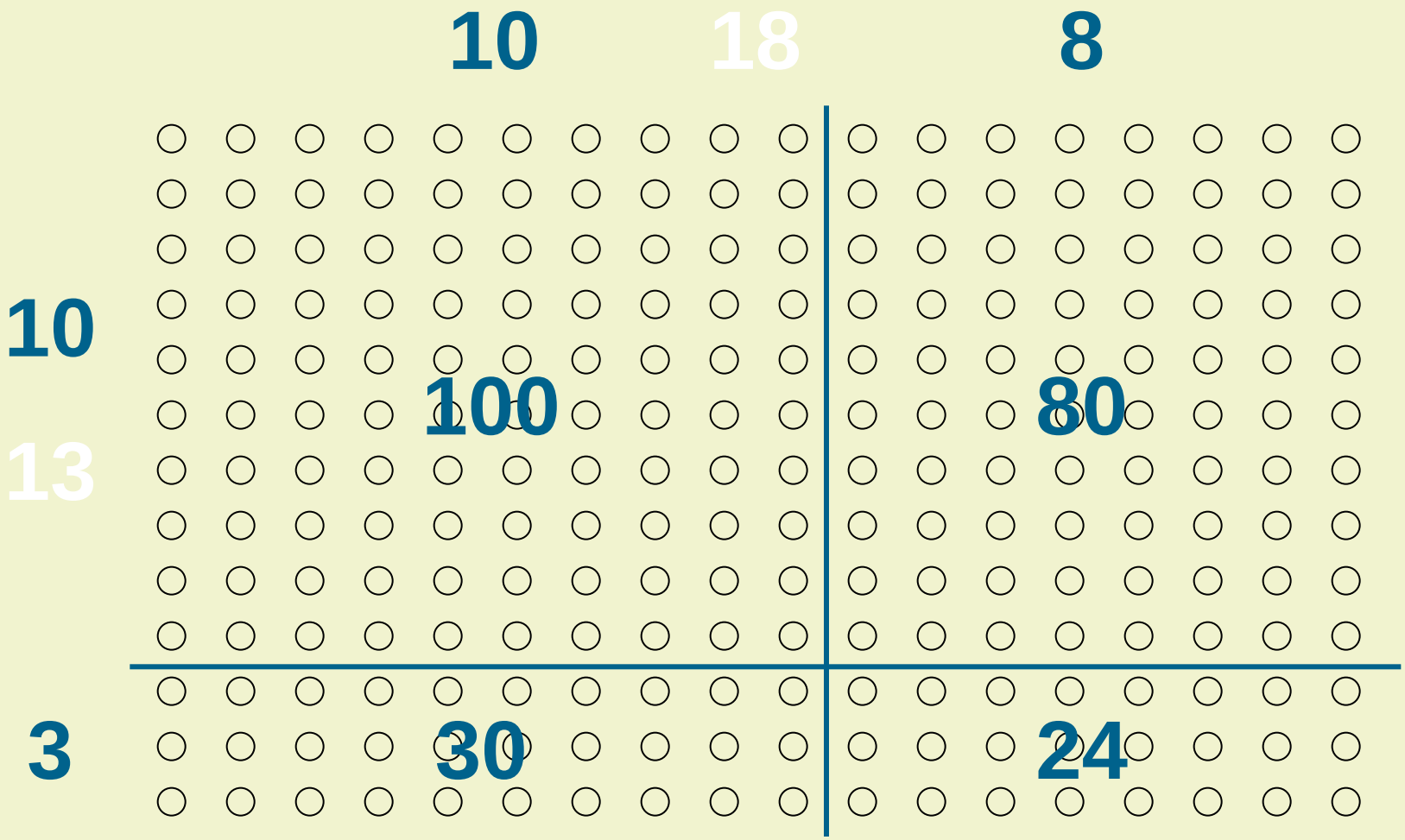
	30	3
10	300	30
4	120	12

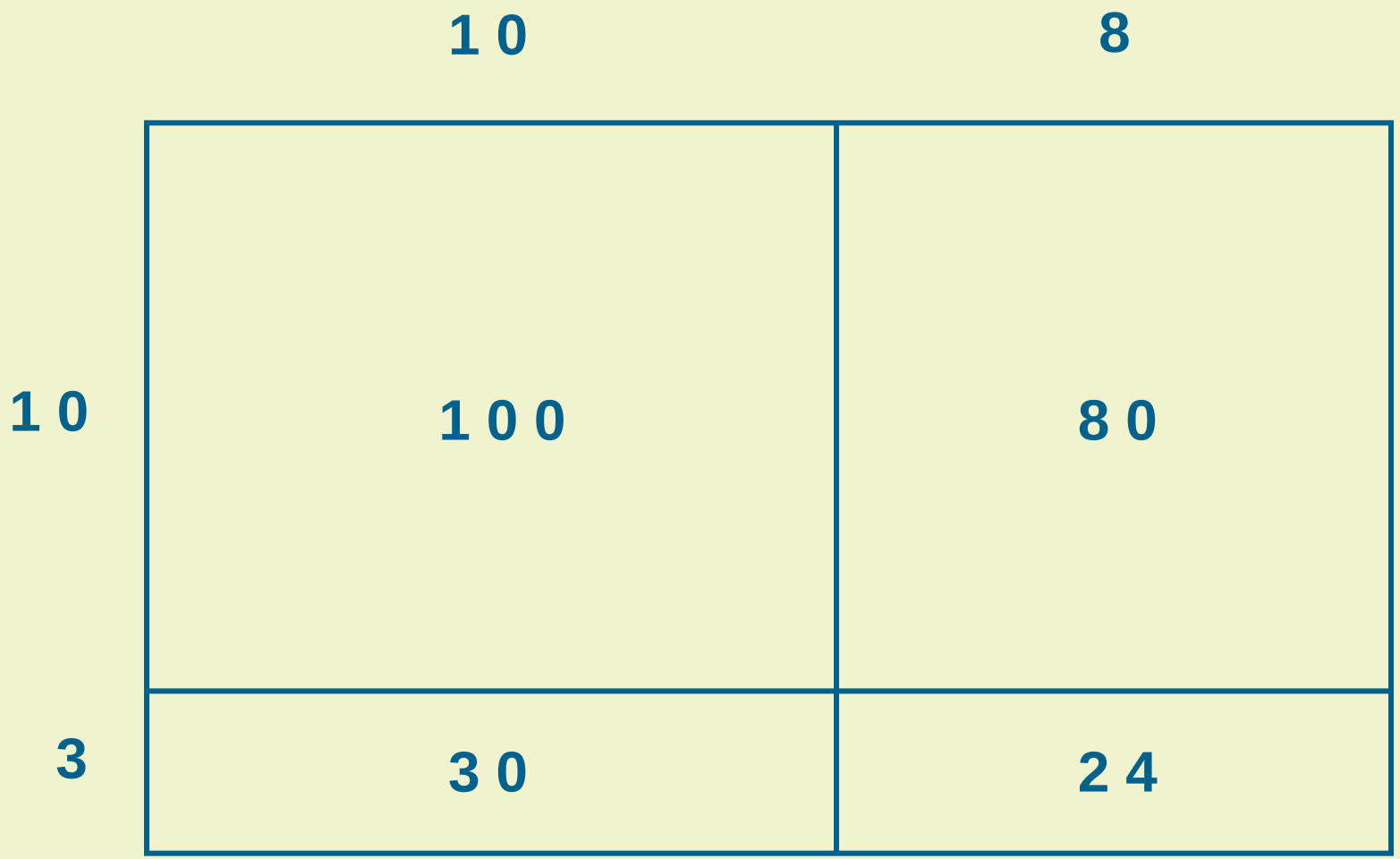
= 330 +

= 132

462

BBC News Video Link


10
18
8
10
13
100
80
3
30
24


10
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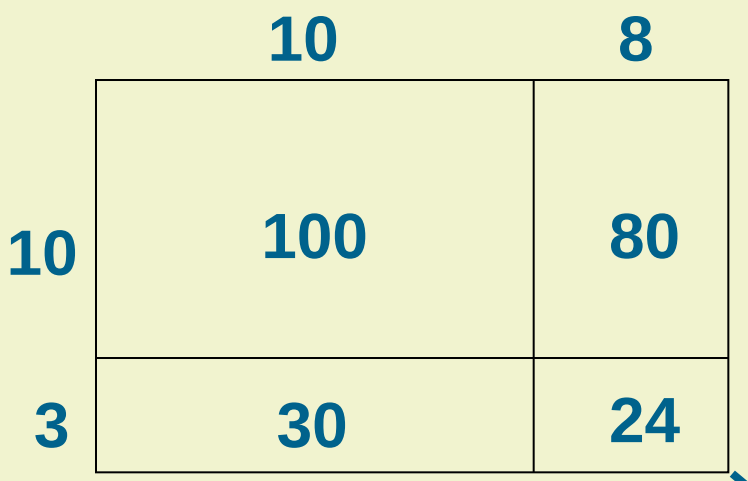


		1	8			
	×	1	3			
		5	4			
	1	8	0			
	2	3	4			

Use the grid method to work these out:

24 x 7

142 x 3

14 x 33

	30	3
10	300	30
4	120	12

= 330 +

= 132

462

Division

cut	each
evenly	Every
Quotient	out of
equal parts	divided by
In half	average

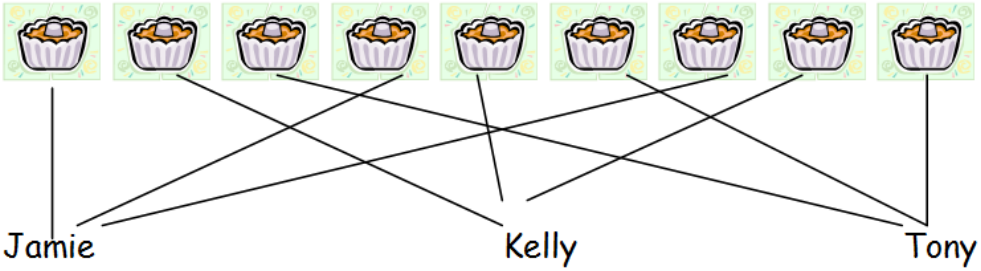
How would you solve these?

- 123 ÷ 3
- 165 ÷ 10
- 325 ÷ 25
- 623 ÷ 24

Division

Sharing

The tray had 9 cakes in and they were shared out between Jamie, Kelly and Tony. Each child had the same number of cakes. How many did they have each?



So, 9 ÷ 3 = 3

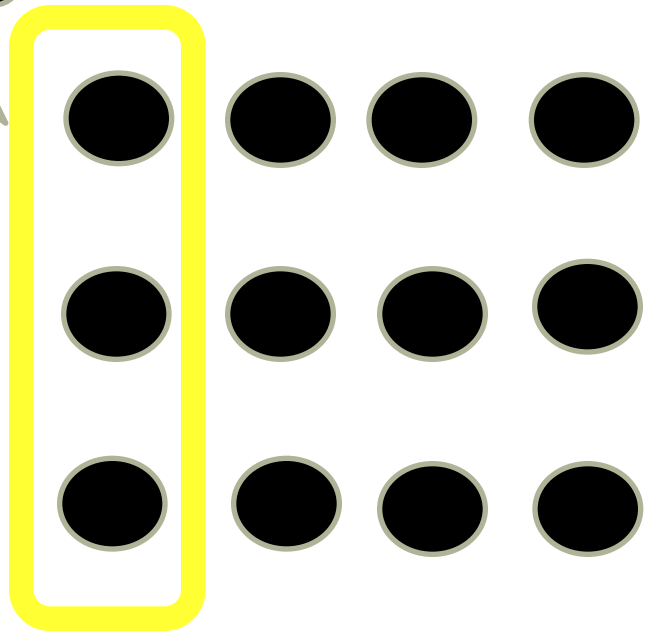
Grouping

The apples need putting into bags with 5 apples in each bag. Julie has 15 apples. How many bags will she need?

So, 15 ÷ 5 = 3

Stage 2: Arrays

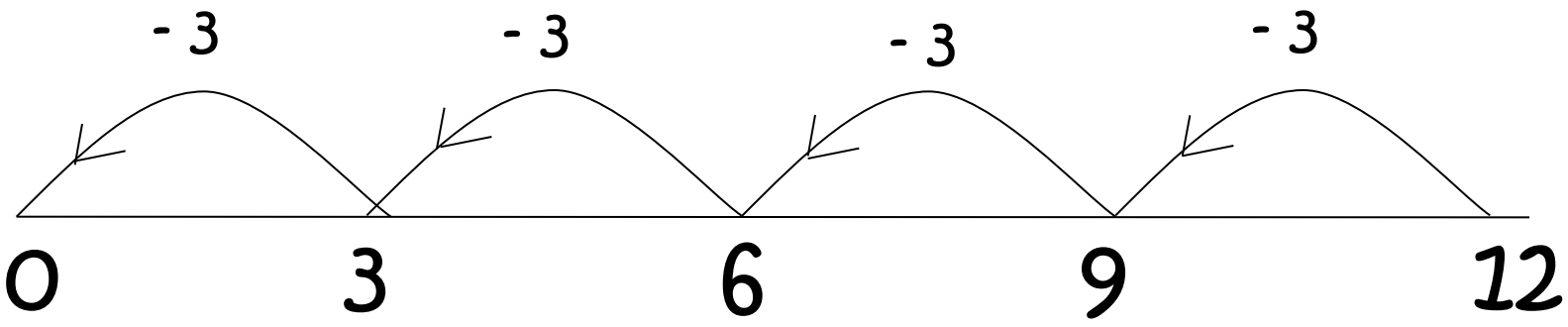
First group of 3



$12 \div 3 = 4$

Stage 3: Repeated subtraction

12 ÷ 3 = 4

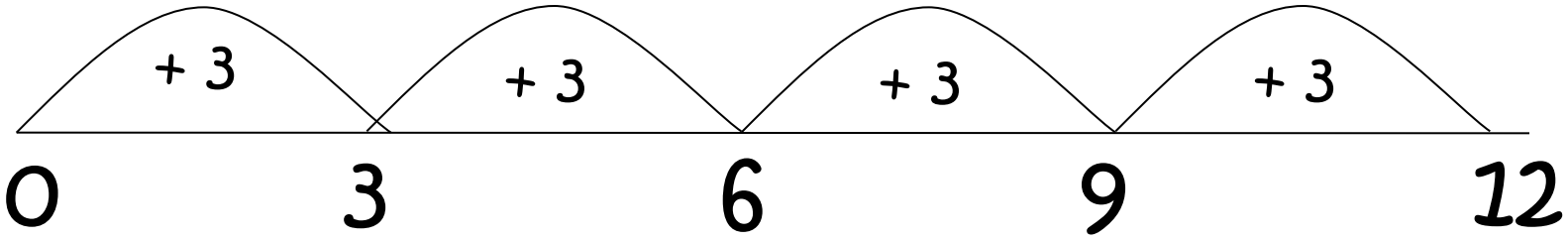


12 - 3 - 3 - 3 - 3 = 4 groups of 3.

Counting in steps

12 ÷ 3 = 4

Add the jumps



Fingers

“3 “6 “9 “12

MATHS WEBSITES

www.whiz.com

www.ictgames.com

www.bbc.co.uk/schools

www.crickweb.co.uk

www.counton.org

www.mathzone.co.uk

www.nrich.maths.org

www.mathsplayground.com

www.lancsngfl.ac.uk

www.childparenting.about.com

www.mad4maths.com

www.maths-games.org

www.topmarks.co.uk

www.mathletics.co.uk

www.themathsfactor.com

www.mathsformumsanddads.co.uk

Thank you!