

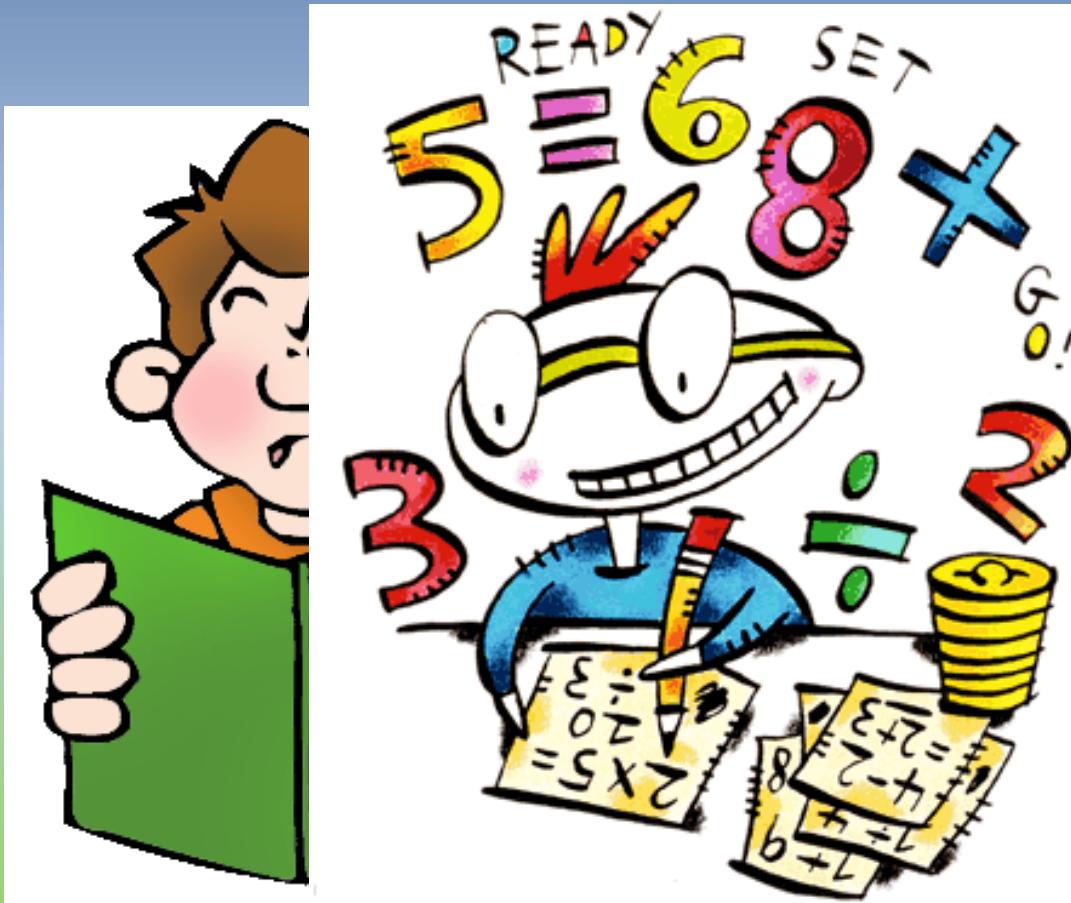
Maths from the Masters

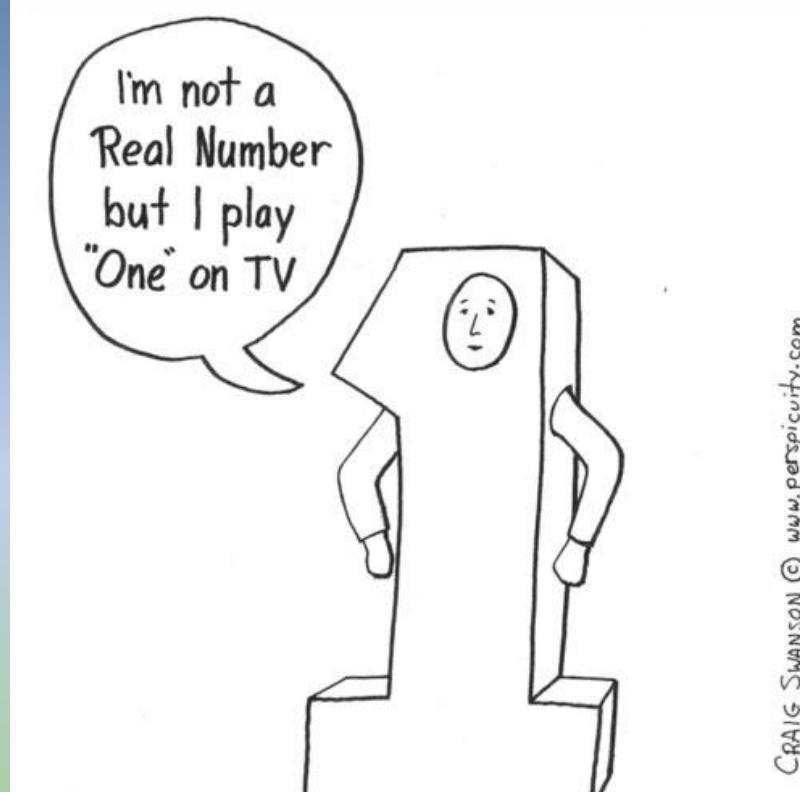


27th November 2019



Aim: helping to make your child become a confident mathematician





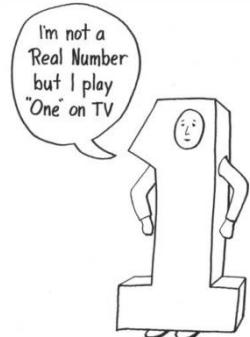
I'm not a
Real Number
but I play
"One" on TV

CRAIG SWANSON © www.perspicuity.com

A Sesame Street Public Message

Understanding is Key

- Emphasis has shifted from ‘how’ to do a sum to being much more about ‘why’.
- Moving away from the purely learning by rote to understanding.
- We work on embedding good number knowledge and knowing number facts to enable a greater understand of how numbers work.





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There's more than one way...

...to get to the right answer.

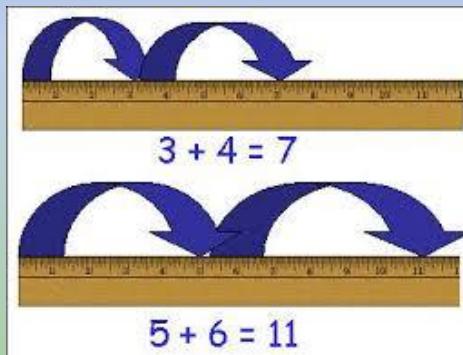
- As long as the answer is right- there is no right or wrong way.
- Our job is to help children work out the best way for them. An efficient method and one that helps them with their understanding.
- In one classroom you could see many different methods being taught and employed to solve one problem.
- Having a range of methods helps children improve and check their accuracy.

Keeping it Practical

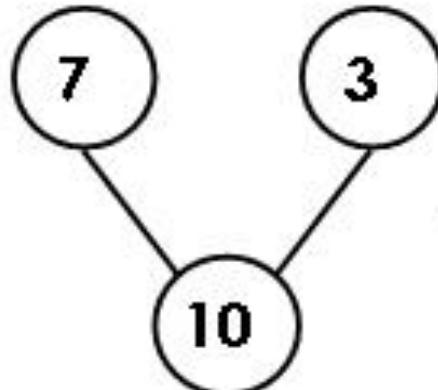
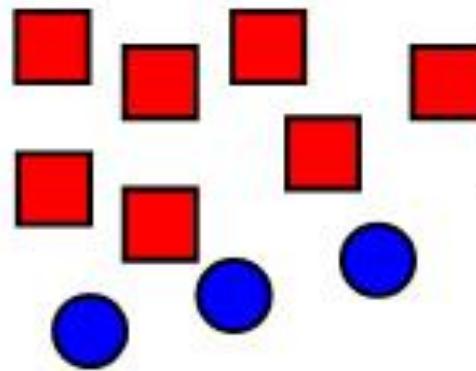
- CPA



- Using equipment e.g. ruler as a number line not just to draw straight lines.



- Not just sums! Lots of problem solving, activities challenges, practical sessions.



$$7 + 3 = 10$$

Concrete

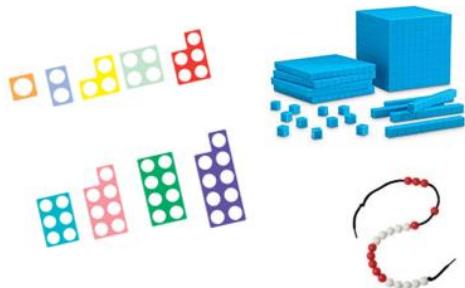
Pictorial

Abstract

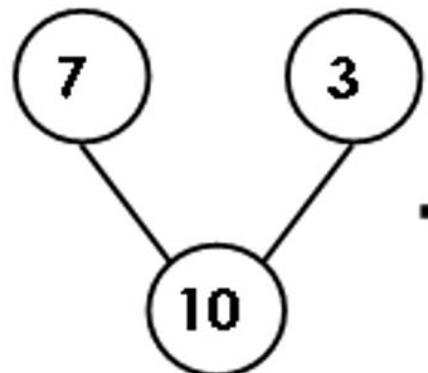
Step one – most important!



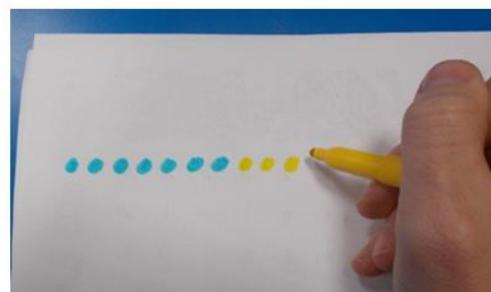
Concrete



Step two



Pictorial



Step three –
avoid until Year 2

$$7 + 3 = 10$$

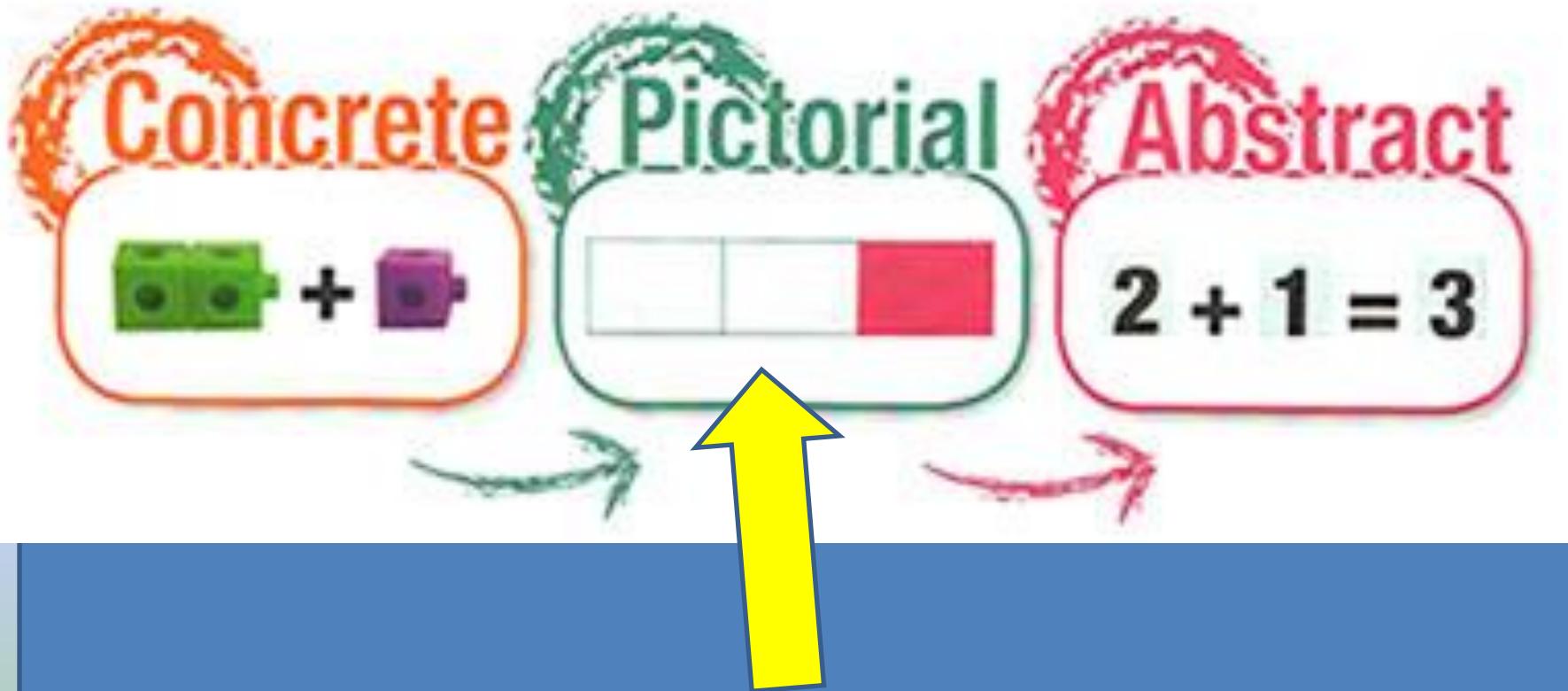
Abstract



Concrete representation

The enactive stage - a student is first introduced to an idea or a skill by acting it out with real objects. In division, for example, this might be done by separating apples into groups of red ones and green ones or by sharing 12 biscuits amongst 6 children.

This is a 'hands on' component using real objects and it is the foundation for conceptual understanding.



Pictorial representation

The iconic stage - a student has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or picture of the problem.

In the case of a division exercise this could be the action of circling objects.



Abstract representation

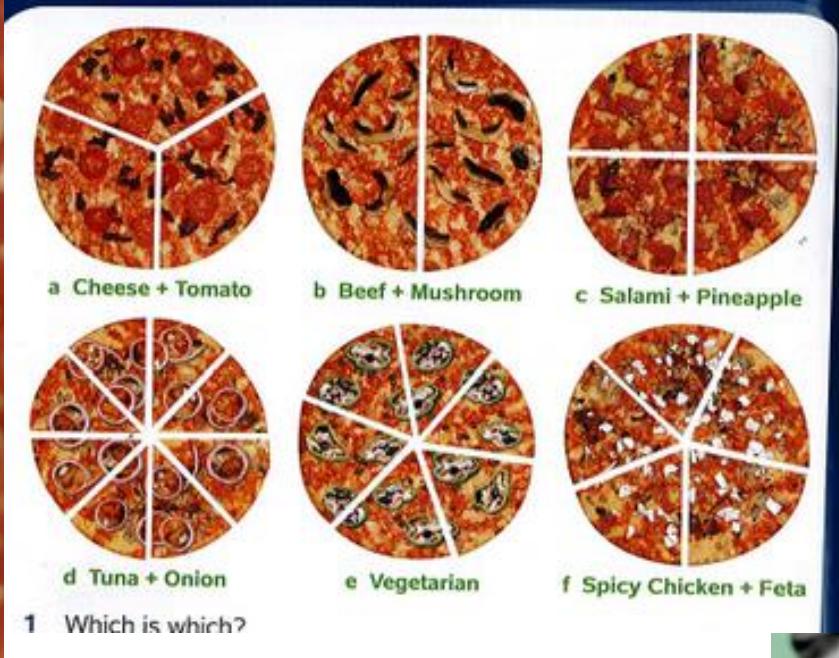
The symbolic stage - a student is now capable of representing problems by using mathematical notation (digits and symbols) for example: $12 \div 2 = 6$

This is the stage where aim for the children to end up, as it is how we most efficiently represent mathematical problems and solutions.



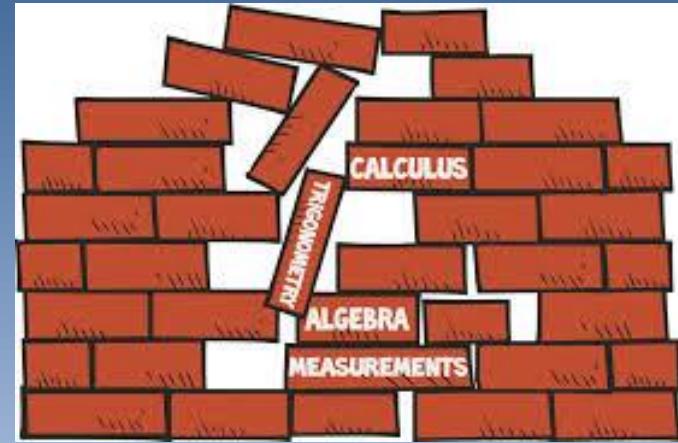
er or say how to do it.

*Did you do it? Can you break the numbers down?
What was the problem and what you can do to*



A Wall

- Maths Learning is like building a wall.
- Children learn lots of different individual skills which like individual bricks build up together to make a proficient mathematician.
- If a brick is wobbly or loose it may be specific skill that needs to be retaught or improved to strengthen the whole wall.



And finally- Never Say...

“I’m bad at Maths!”

Remember you are your child's biggest role model so saying this may make them feel it is okay for them to be bad at Maths and therefore that they do not need to try.

**THERE ARE 3 KINDS OF
PEOPLE IN THIS WORLD**
THOSE WHO ARE GOOD AT MATH,
AND THOSE WHO AREN'T

When helping your child at home, don't forget...

- Maths today is about understanding **number patterns**, not learning by rote.
- Saying "**I was bad at maths too**" is one of the **worst things** you can do as it lowers children's own expectations of themselves.
 - There is always more than one way to get the right answer.
 - Children are taught mental strategies, like **using number lines**, to figure problems out in their heads but encouraged to 'jot' down if they need to.
 - When helping 'ask' rather than 'tell' to support learning.
 - Learn and Practise times tables
 - Please do talk to us if you feel your child needs more help when they really struggle with homework.

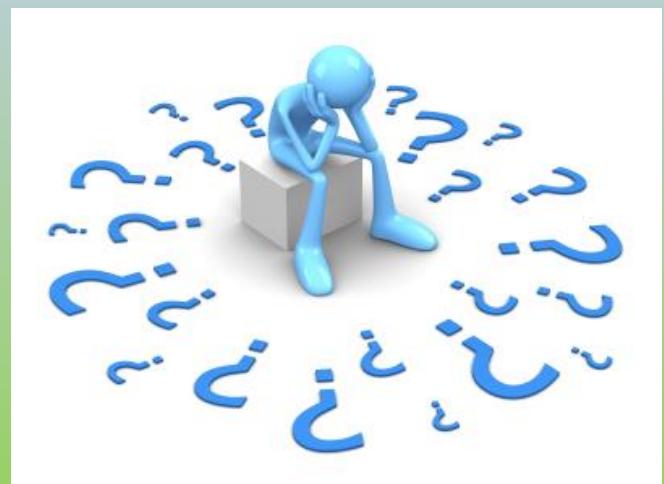
National Curriculum



- The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils **become increasingly fluent with whole numbers and the four operations**, including number facts and the concept of place value. This should ensure that pupils develop **efficient written and mental methods** and perform calculations accurately with increasingly large whole numbers.
- By the end of year 4, pupils should have memorised their multiplication tables up to and including the **12 multiplication table** and show precision and fluency in their work.
- Pupils should **read and spell mathematical vocabulary** correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

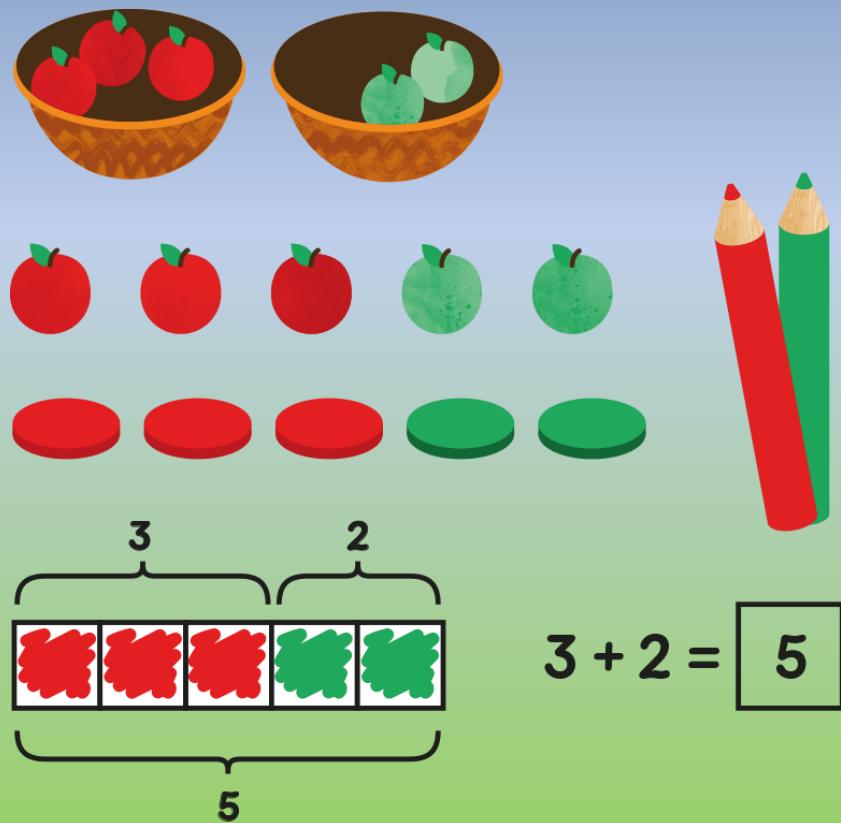
Problem Solving

- Through all of our maths teaching we use problem solving, reasoning and word problems.
- Today we will just be looking at the methods we use.



Addition

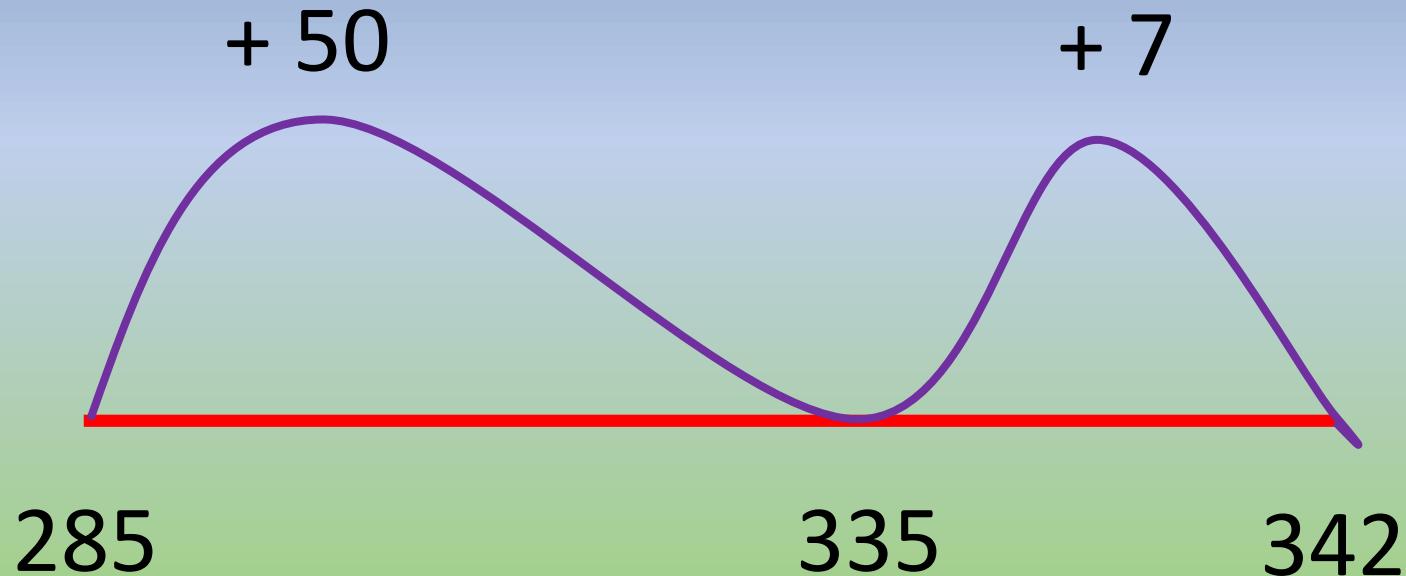
- Using equipment and pictures.



Addition

- Using a number line:

$$285 + 57 = 342$$



Addition

- Using expanded vertical:

$$336 + 87 = 423$$

$$\begin{array}{r} 336 \\ \underline{+ 87} \\ 13 \quad (6 + 7) \\ 110 \quad (30 + 80) \\ \underline{300} \quad (300 + 0) \\ 423 \end{array}$$

Addition

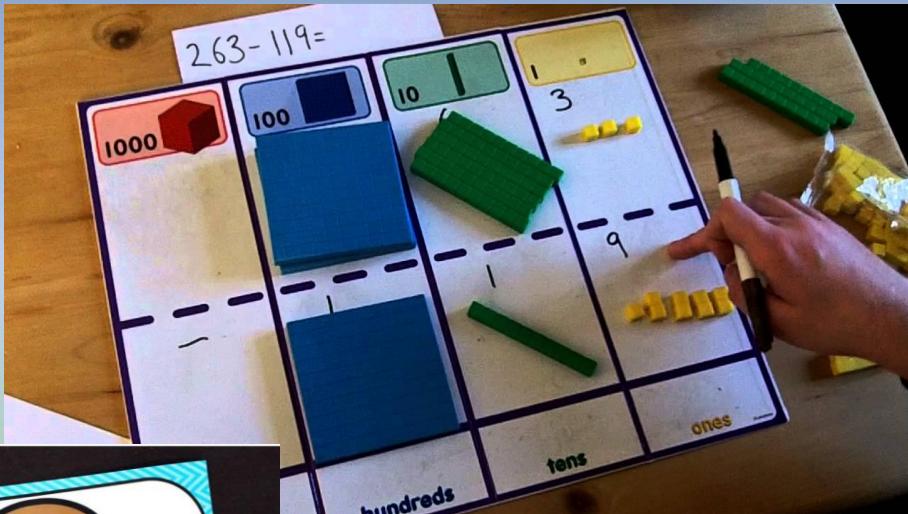
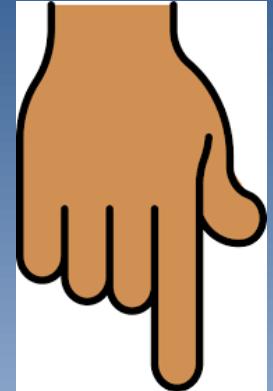
- Using compact vertical:

$$2,374 + 248 = 2,622$$

$$\begin{array}{r} 2374 \\ 248 + \\ \hline 2622 \\ 11 \end{array}$$

Subtraction

- Using equipment and pictures.

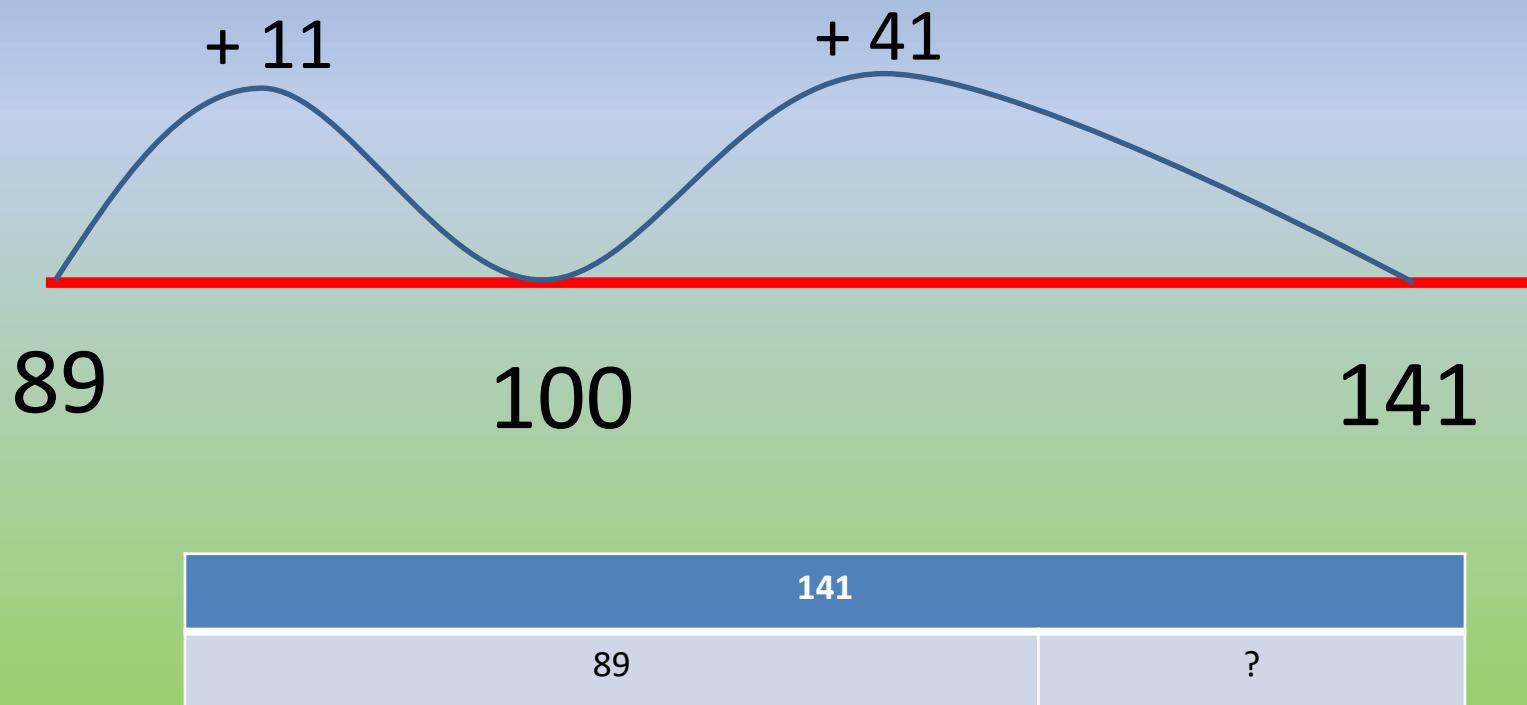
A worksheet containing several subtraction problems, each accompanied by a set of objects to count. The problems are:
 $3 - 1 =$ (Three soccer balls)
 $6 - 4 =$ (Six butterflies minus four butterflies)
 $7 - 2 =$ (Seven aliens minus two aliens)
 $8 - 6 =$ (Eight baseball gloves minus six baseball gloves)
 $5 - 0 =$ (Five party hats)

Subtraction

Adding
on

- Using a number line:

$$141 - 89 =$$



$$773 - 458 =$$

H	T	U
700	70 60	(10+3 =) 13
400	50	8
300	10	5

Subtraction

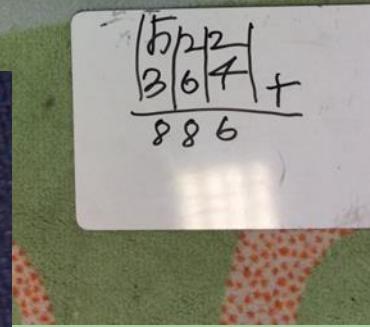
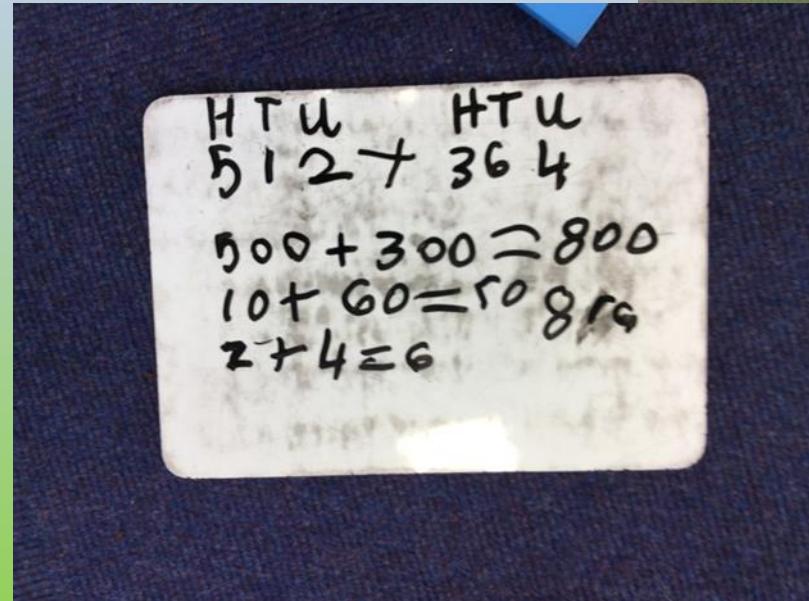
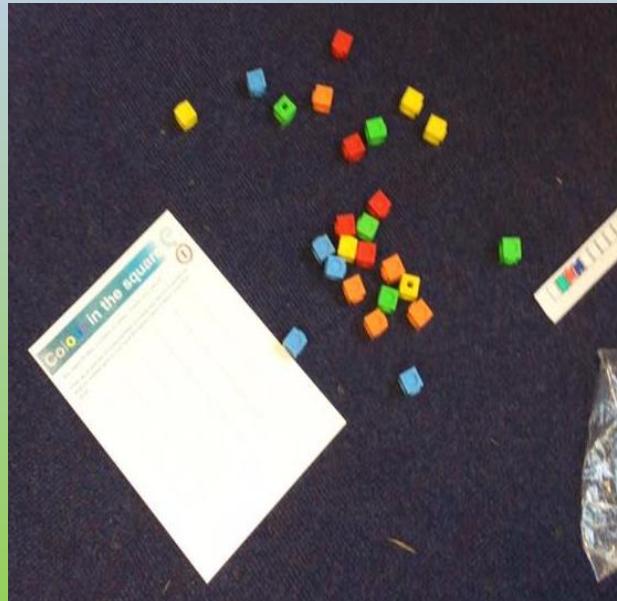
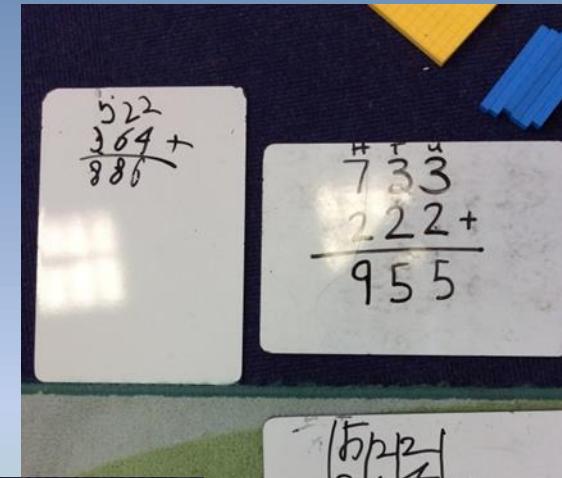
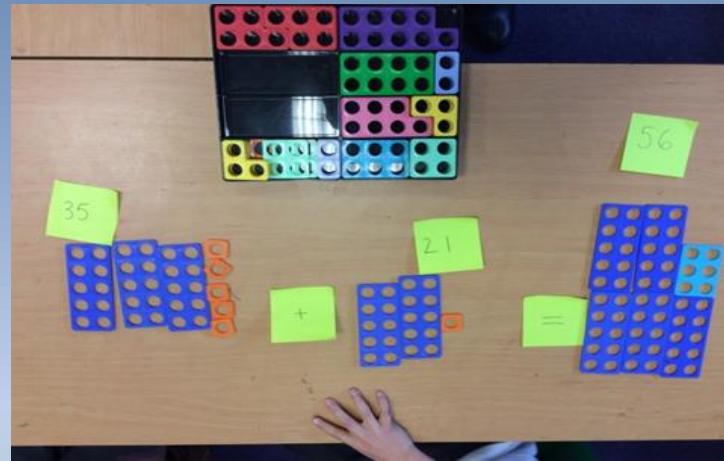
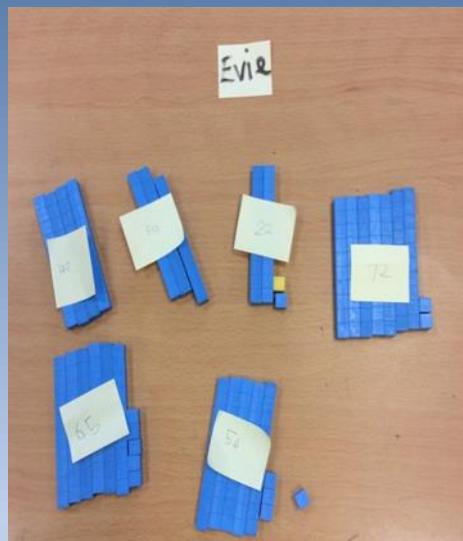
- Using compact method:
(exchanging Ts and Hs)

$$\begin{array}{r} ^6\cancel{7}\ 1\cancel{2}\ ^13 \\ - 4\ 5\ 8 \\ \hline 2\ 6\ 5 \end{array}$$

Top Tip:
Ask yourself!
*Can I take away 8 from
3?*



Now it's time to learn from the real masters ...



Multiplication

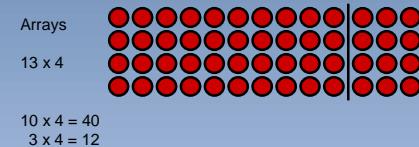
- Using partitioning:

$$14 \times 6 = 84$$

$$10 \times 6 = 60$$

$$4 \times 6 = 24$$

$$60 + 24 = 84$$



Top Tip:
Magic Finger!
Hide the zero.

Multiplication

- Using compact grid method:

$$43 \times 6 = 258$$



X	6
40	240 ($6 \times 40 = 240$)
3	<u>18</u> ($3 \times 6 = 18$)
	258

Multiplication

- Using expanded vertical:

$$65 \times 4$$

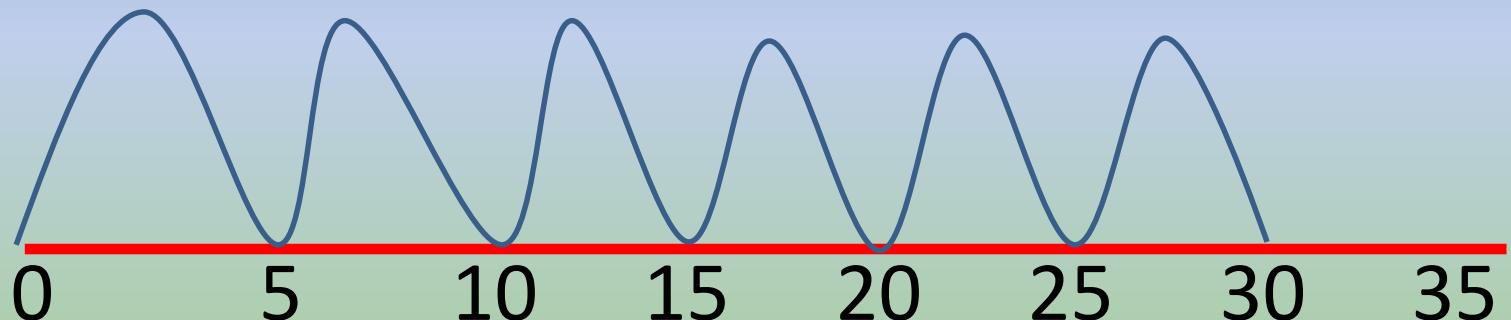
Moving
to
compact

$$\begin{array}{r} 65 \\ \times 4 \\ \hline 20 \quad (4 \times 5) \\ \hline 240 \quad (4 \times 60) \\ \hline 260 \end{array}$$

Division

- Using number lines:

$$33 \div 5 = 6 \text{ r. } 3 \text{ (counting in 5's)}$$



Division

- Using chunking:

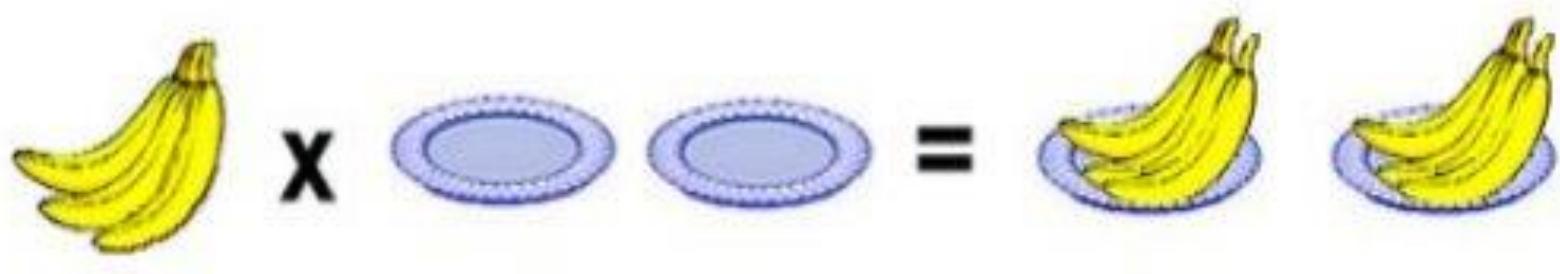
$$96 \div 7 = 13 \text{ r. } 5$$

$$\begin{array}{r} \sqrt{96} \\ \underline{-70} \quad (7 \times 10) \\ \hline 26 \\ \underline{-21} \quad (7 \times 3) \\ \hline 05 \end{array}$$

Much of this relies on...

- Time tables

Something that hasn't changed!



Three times two equals six

$$3 \times 2 = 6$$

Confidence in knowing your tables leads to confidence in all maths especially when children realise that most things link to tables- fractions, division, perimeter, area, money...