Learning First Federation

Supporting my child in Maths

Tuesday 20th November

Why?

The National Curriculum for mathematics aims to ensure that all pupils:

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

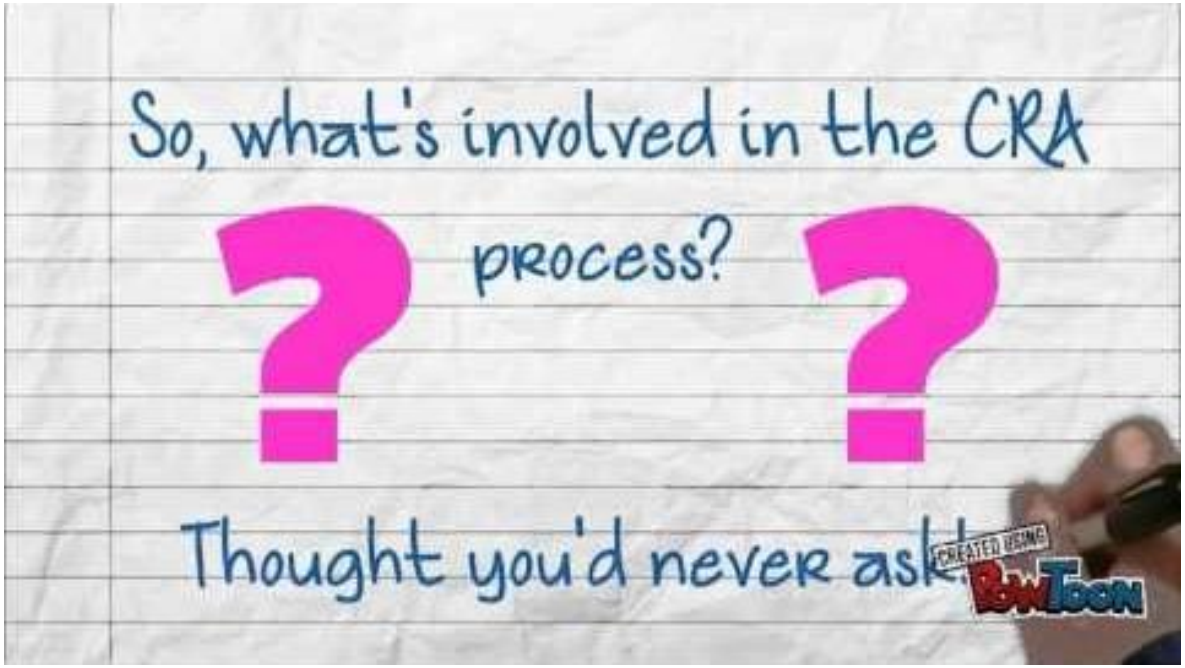
What does it mean to master something?

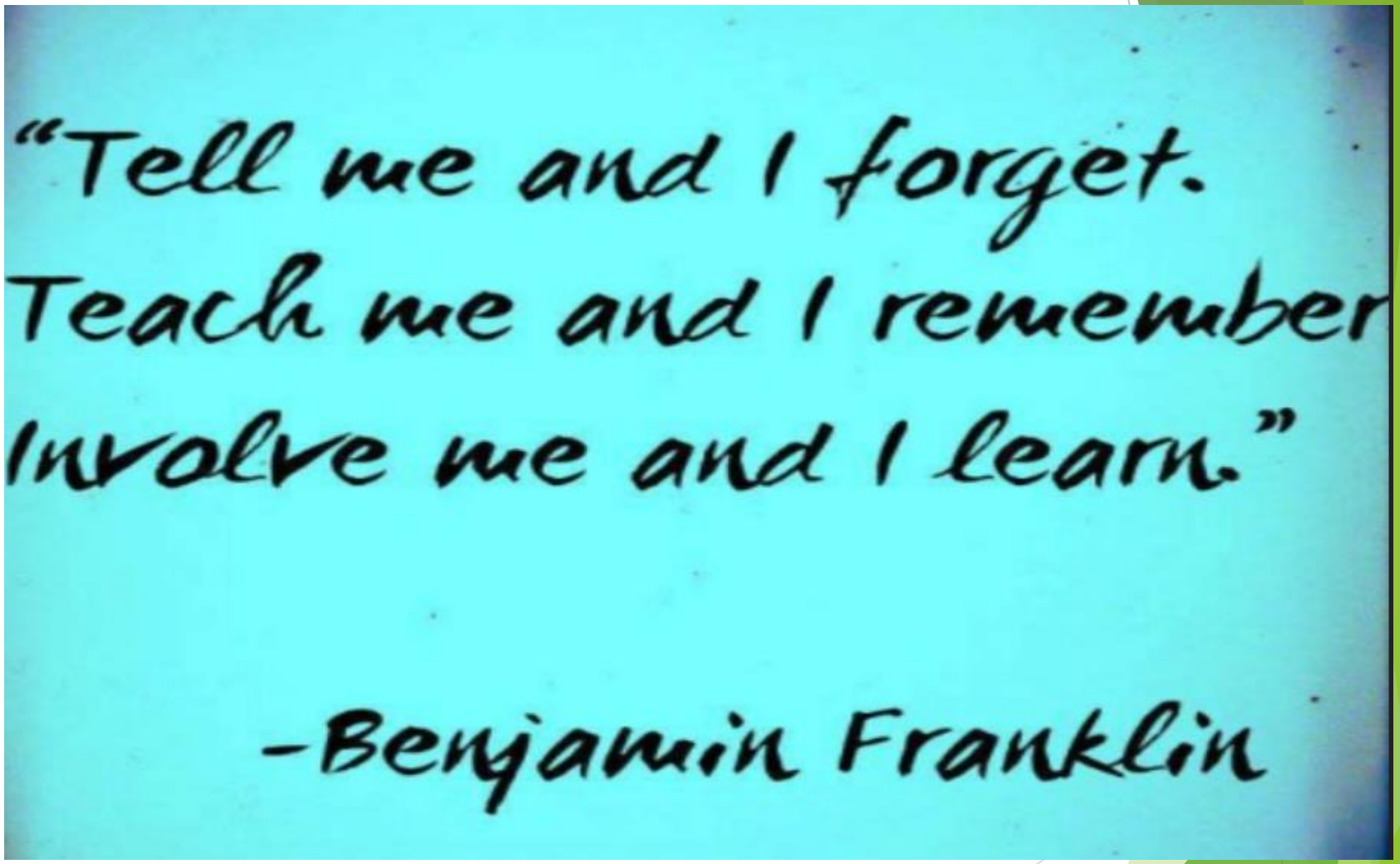
- I know how to do it
- It becomes automatic and I don't need to think about it- for example driving a car
- I'm really good at doing it – painting a room, or a picture
- I can show someone else how to do it.

Mastery of Mathematics is more…..

- Achievable for all
- **Deep** and sustainable learning
- The ability to build on something that has already been sufficiently mastered
- The ability to reason about a concept and make connections
- Conceptual and procedural fluency

What is it?


So, what's involved in the CRA process?
Thought you'd never ask!
CREATED USING
BOWTOON


"Tell me and I forget.
Teach me and I remember
Involve me and I learn."
-Benjamin Franklin

Concrete – getting hands on!

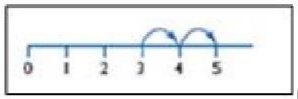
Resources

Resources to help build concepts

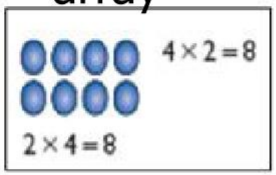
Ofsted

Numicon

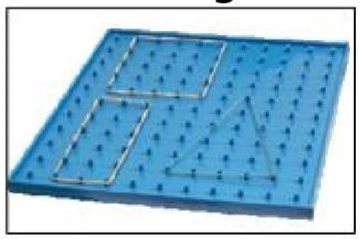
number line



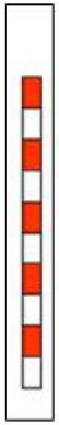
array



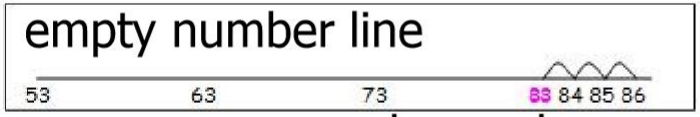
geoboard



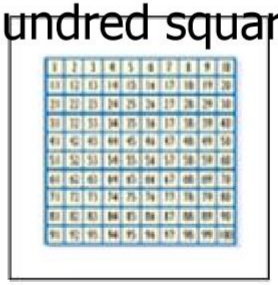
counting stick or metre rule



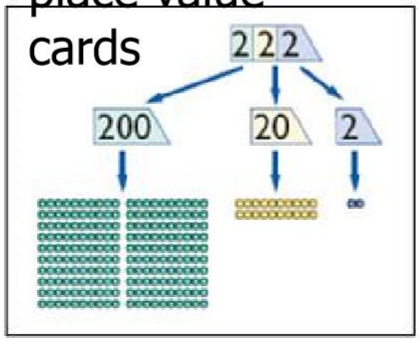
empty number line



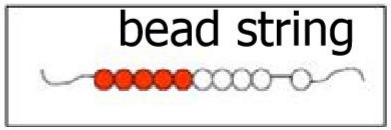
hundred square

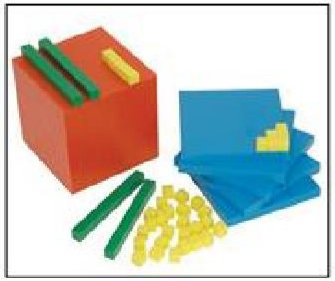


place value cards



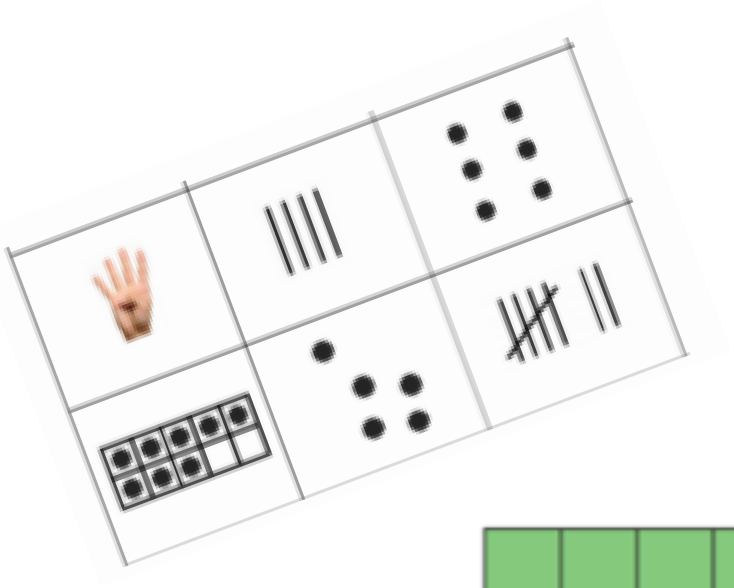
bead string

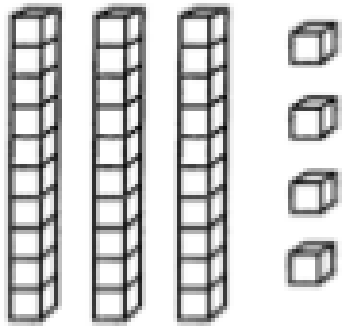


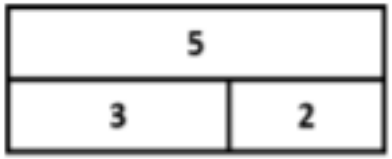


Dienes blocks
base-ten blocks

Pictorial Representation







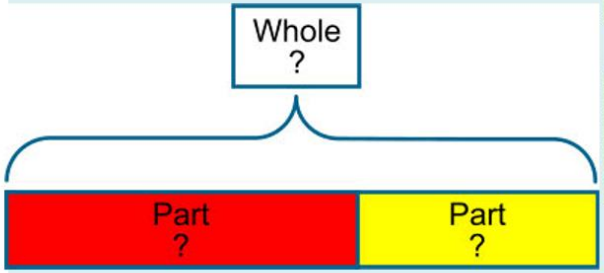
Concrete – Pictorial

Models, images and practical apparatus

Ofsted

All of these play an important part in supporting pupils' conceptual understanding and reasoning skills.

Can you name these?



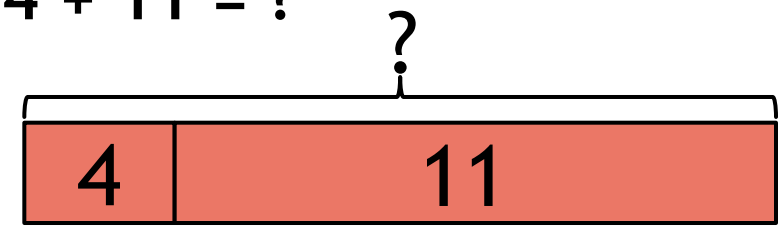
Flexibility with different representations is an important element of fluency.

Bar Modelling – An Example

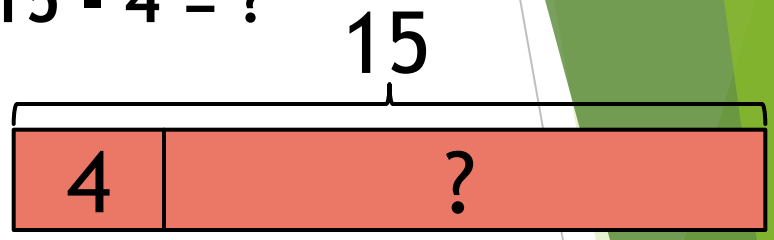
https://youtu.be/l6lpio8JntU

A Consistent Picture

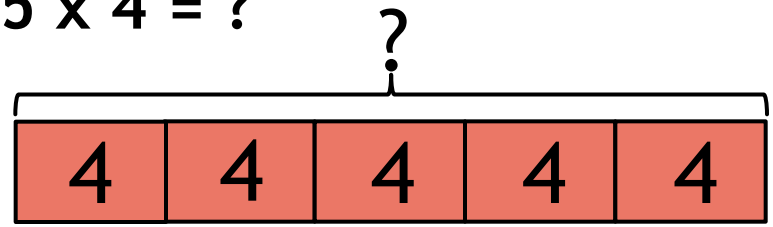
4 + 11 = ?



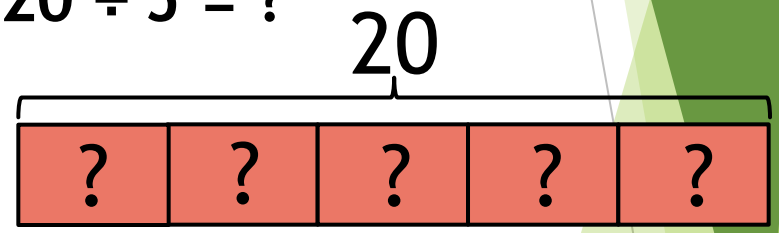
15 - 4 = ?



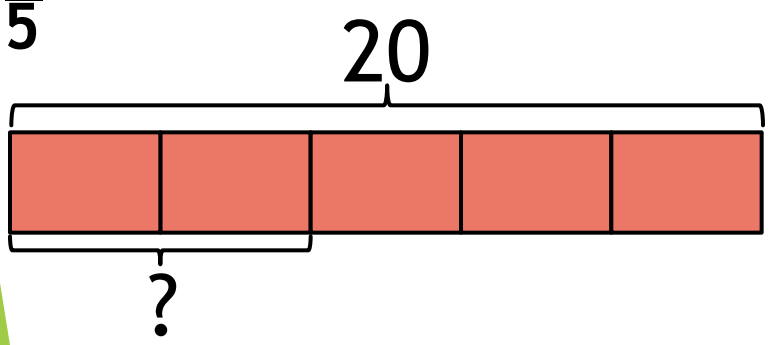
5 x 4 = ?



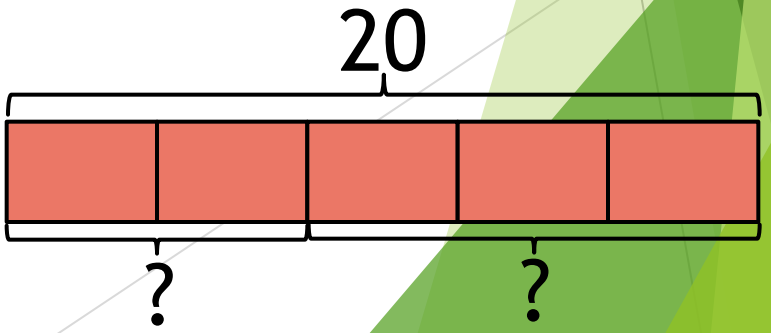
20 ÷ 5 = ?



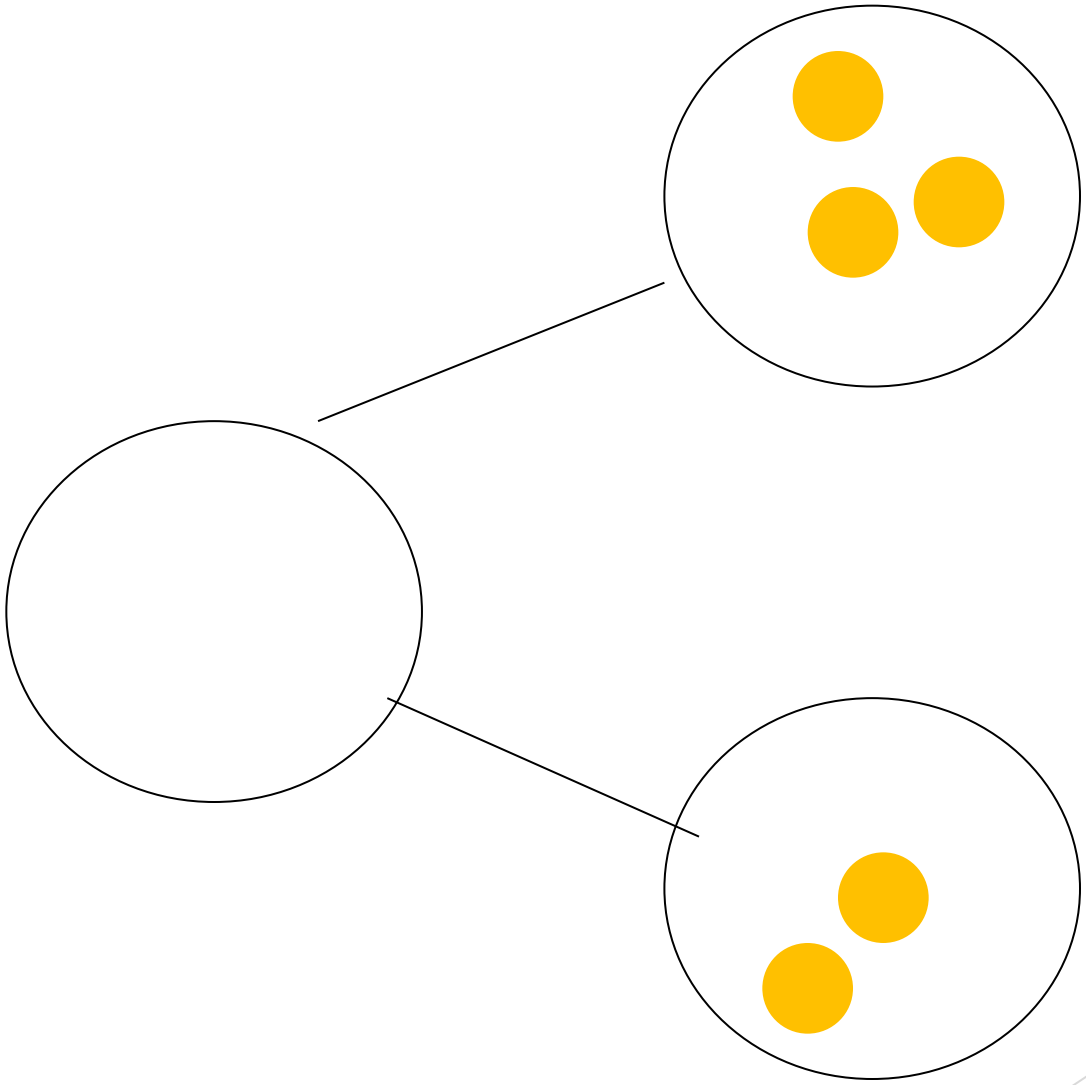
$\frac{2}{5}$ of 20 = ?



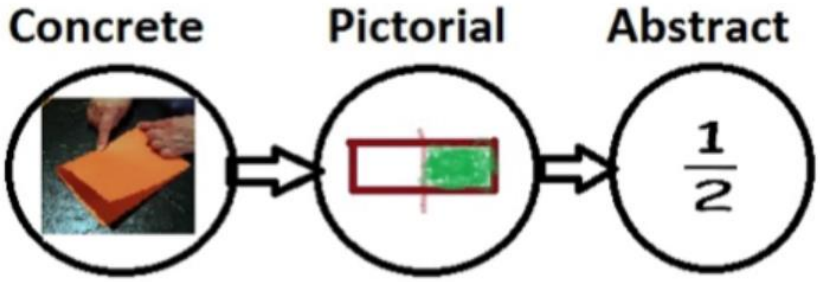
Share 20 in the ratio 2:3

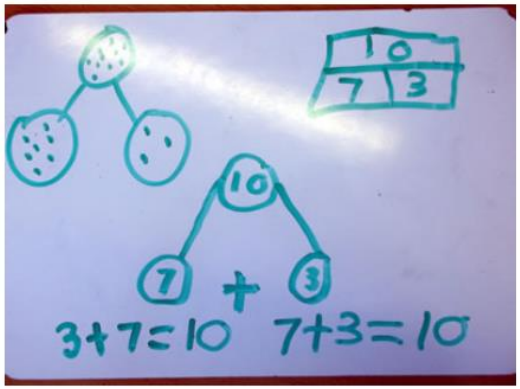


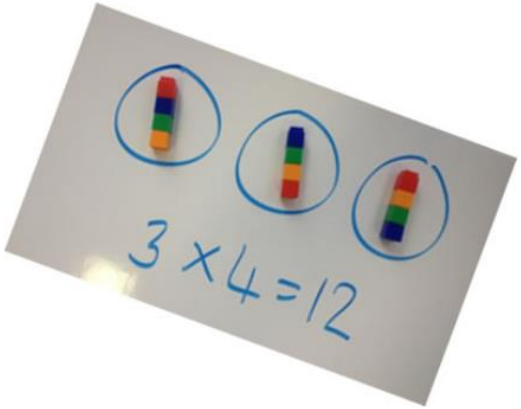
Partitioning and Combining



Bringing ‘concrete, pictorial, abstract’ together:







Some examples of how CPA could work:

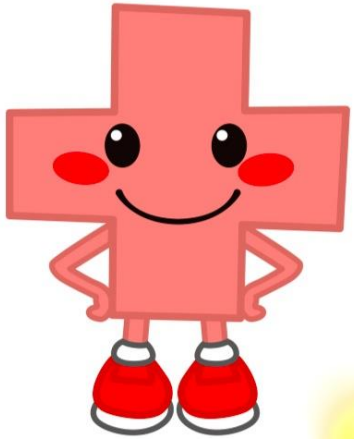
Value Symbols to use in pictorial representation

Thousands

Hundreds

Tens

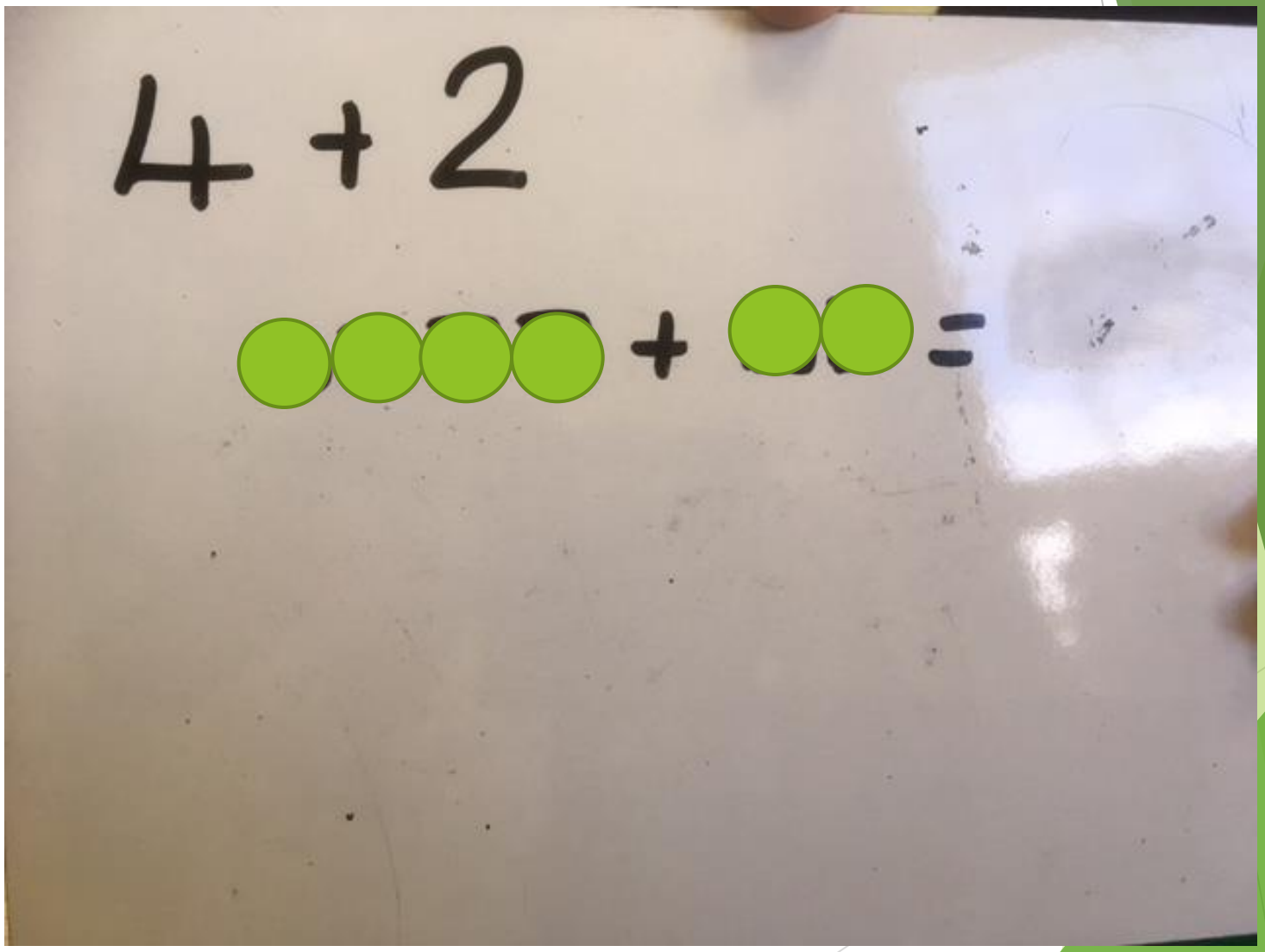
Ones

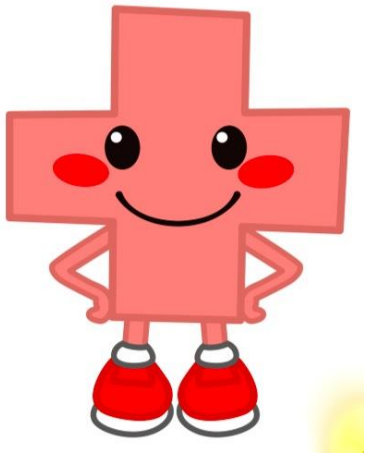


Addition - KS1

4 + 2 =

Pictorial Representation for this...

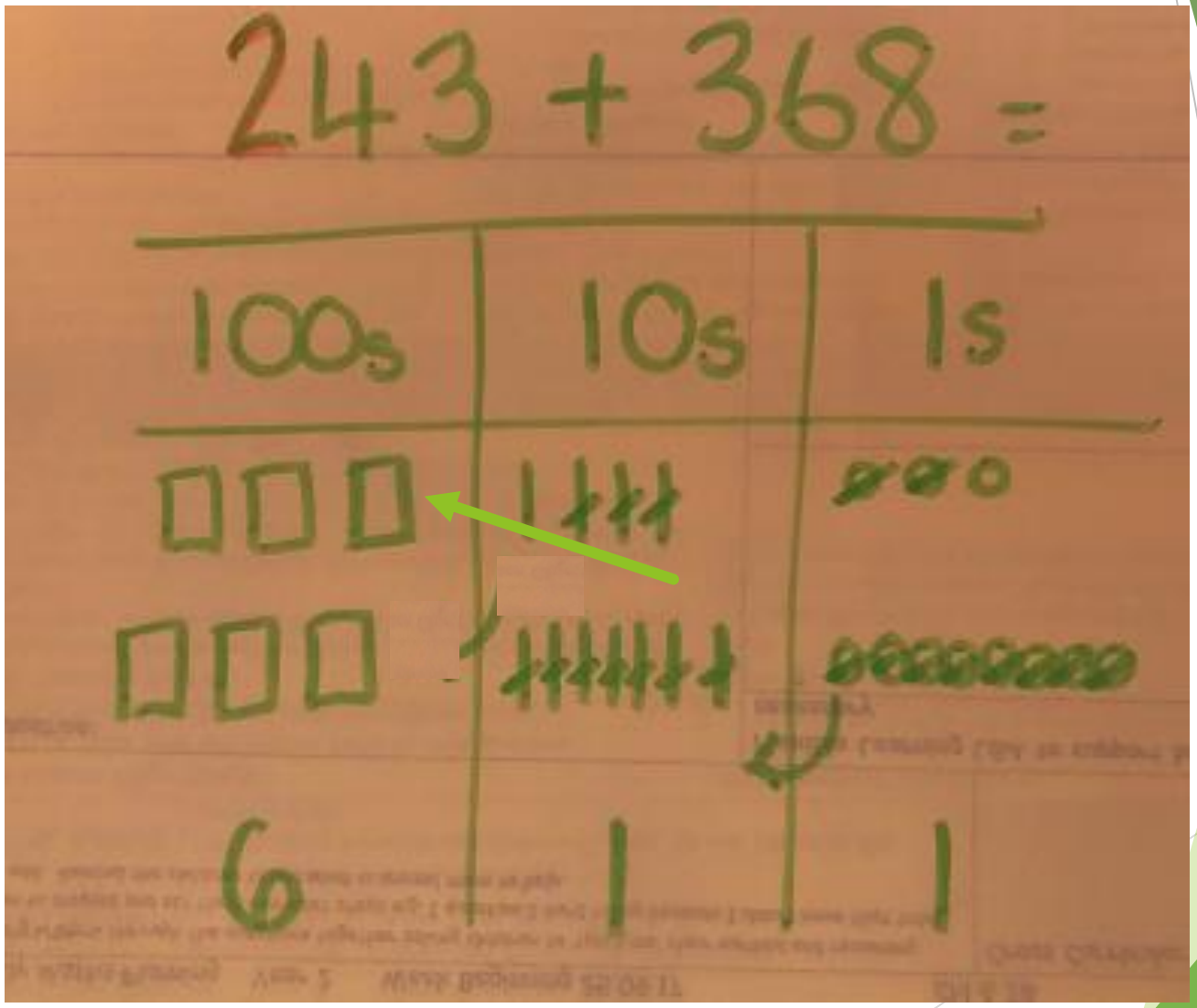




Addition - KS2

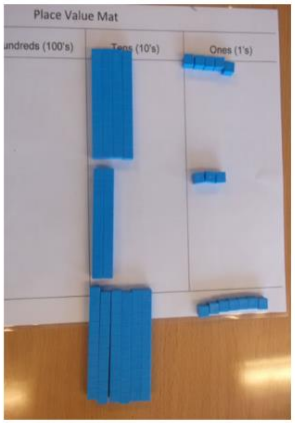
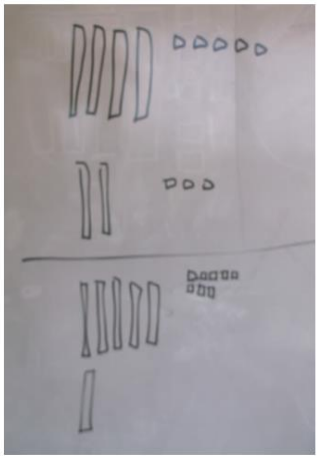
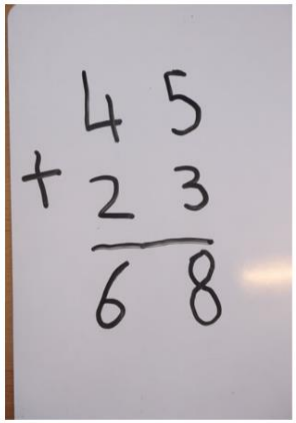
243 + 368 =

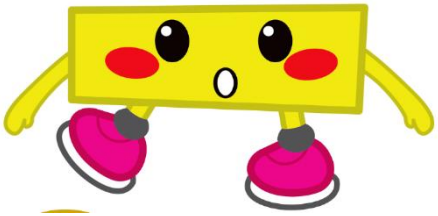
Pictorial Representation for this...



Addition – build up!

Some examples of how CPA could work:

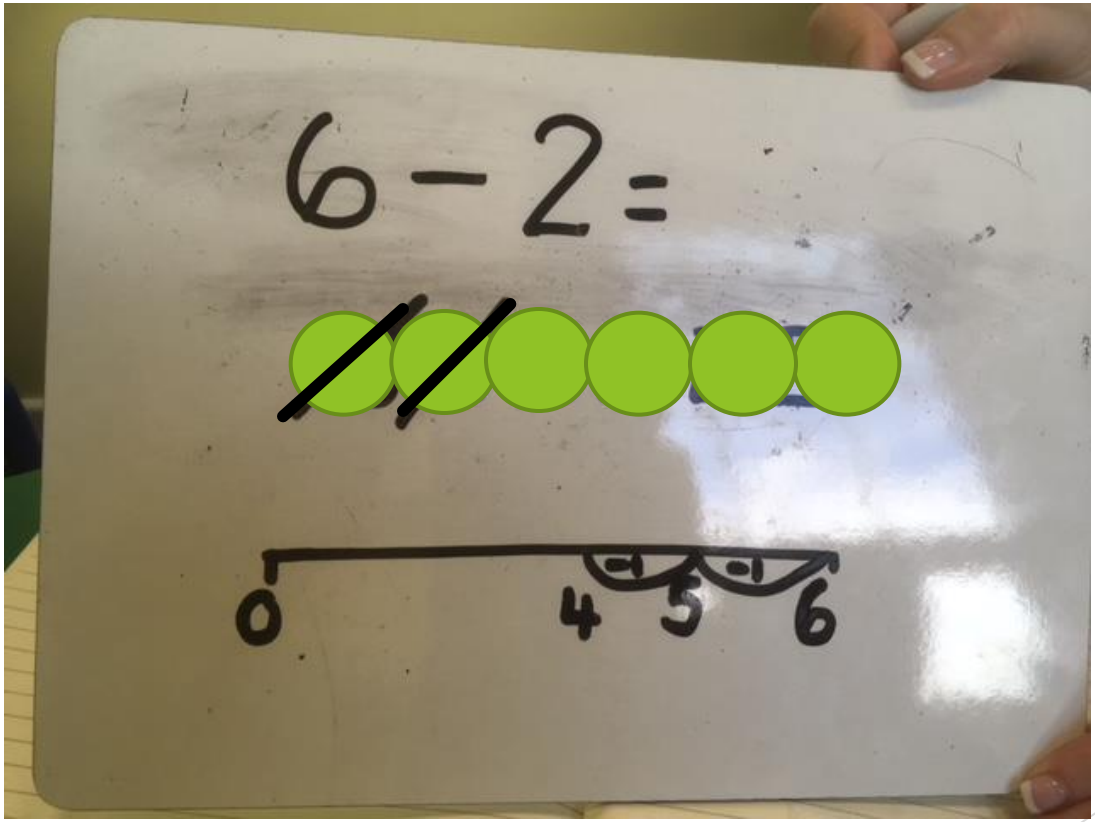
	CONCRETE	PICTORIAL	ABSTRACT
45 + 23			

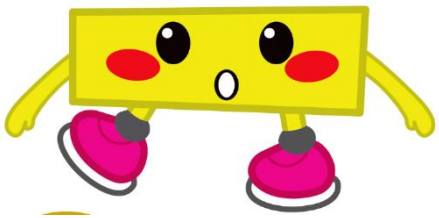


Subtraction - KS1

6 - 2 =

Pictorial Representation for this...

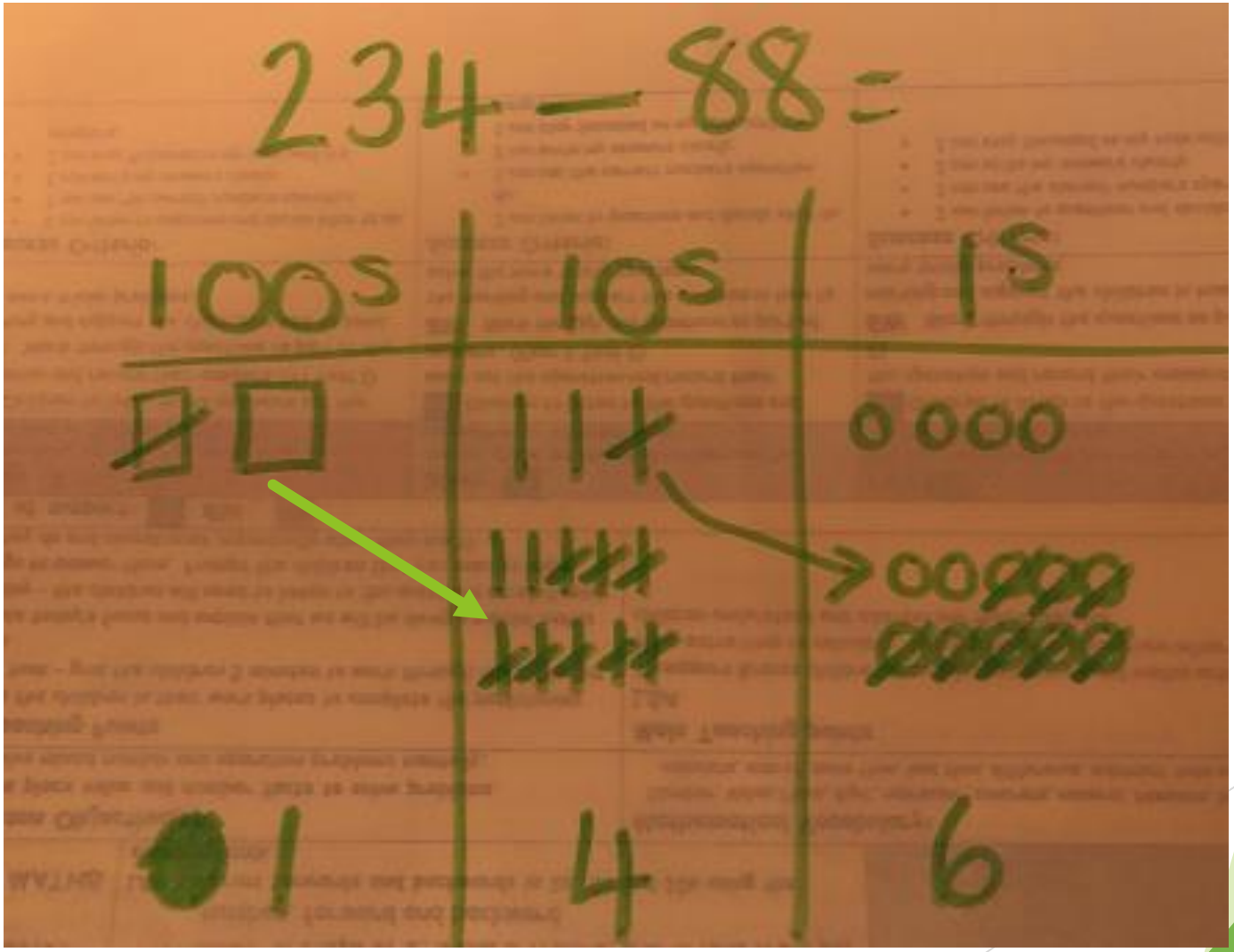




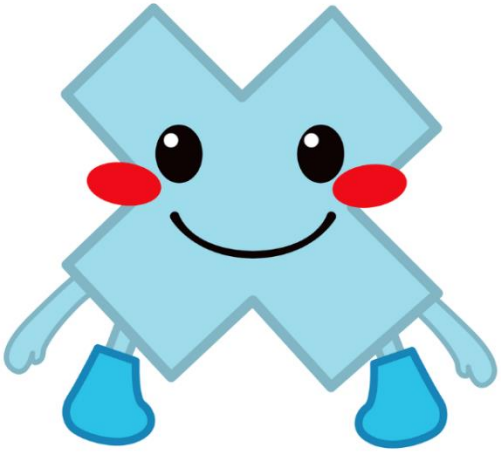
Subtraction - KS2

234 - 88 =

Pictorial Representation for this...

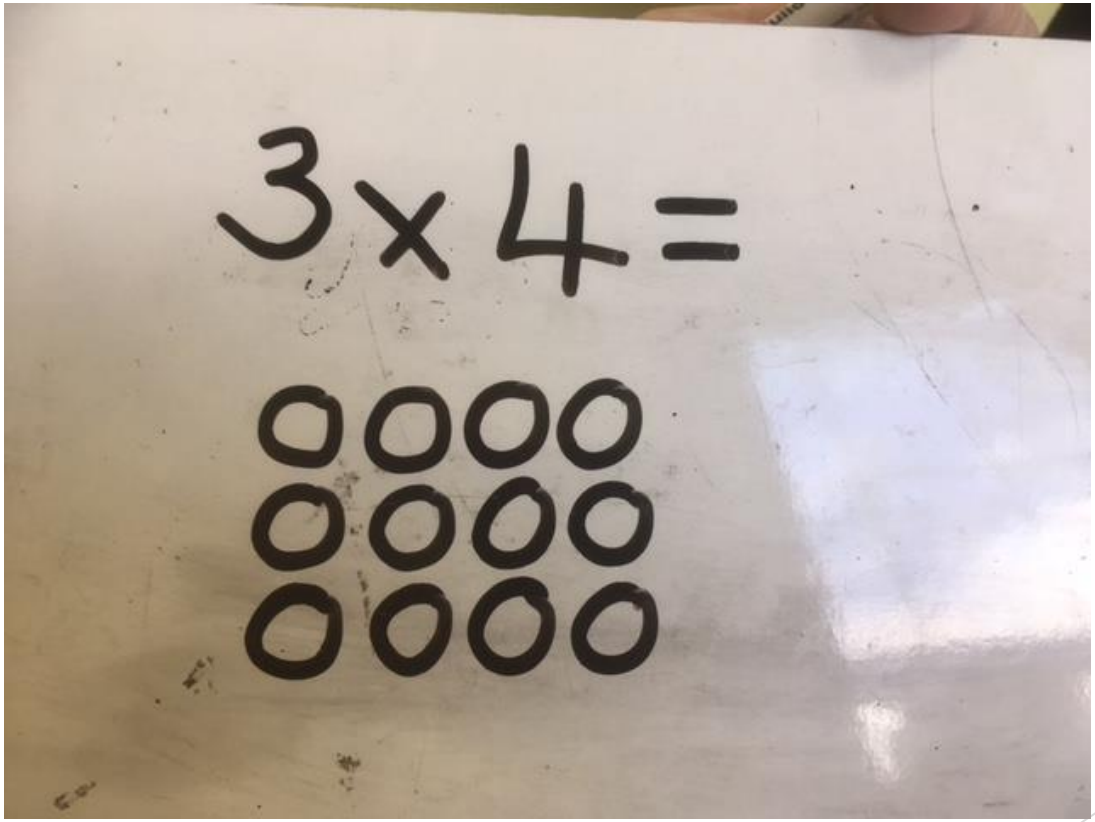


Multiplication - KS1

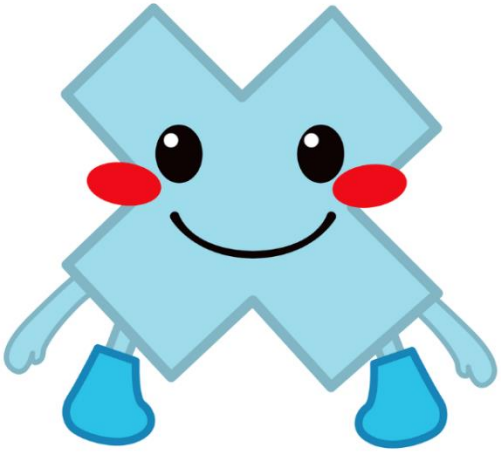


$3 \times 4 =$

Pictorial Representation for this...

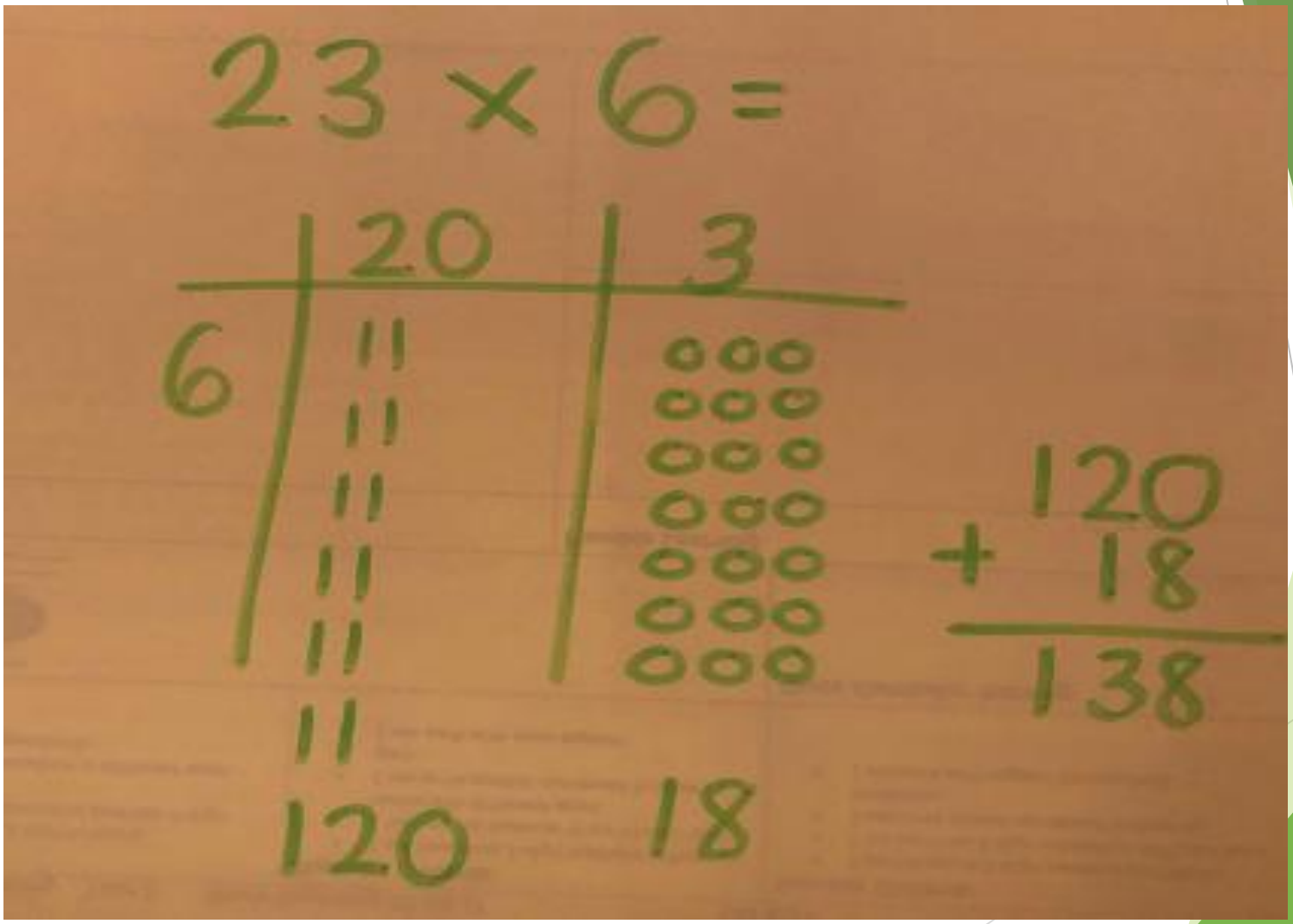


Multiplication - KS2



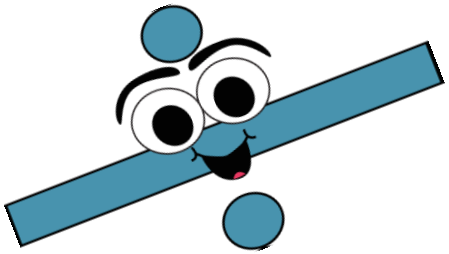
$6 \times 23 =$

Pictorial Representation for this...



Year 4 Multiplication check in June 2020 (current Y3 children)

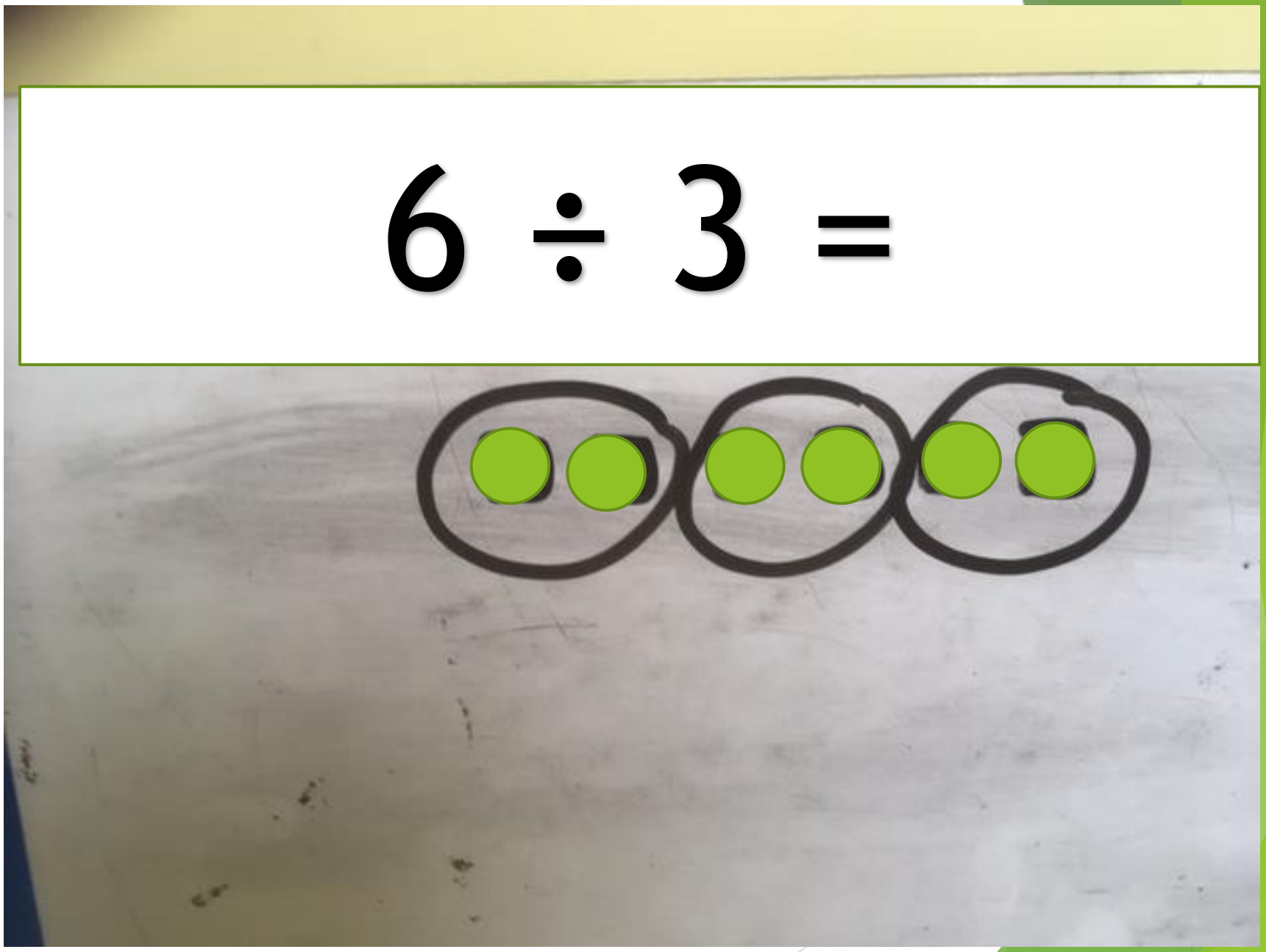
- 25 questions
- 6 seconds per question
- Online based assessment
- ____ x ____ = ____
- Up to 12x12

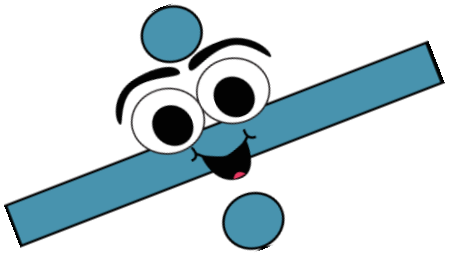


Division - KS1

6 divided by 3 =

6 ÷ 3 =

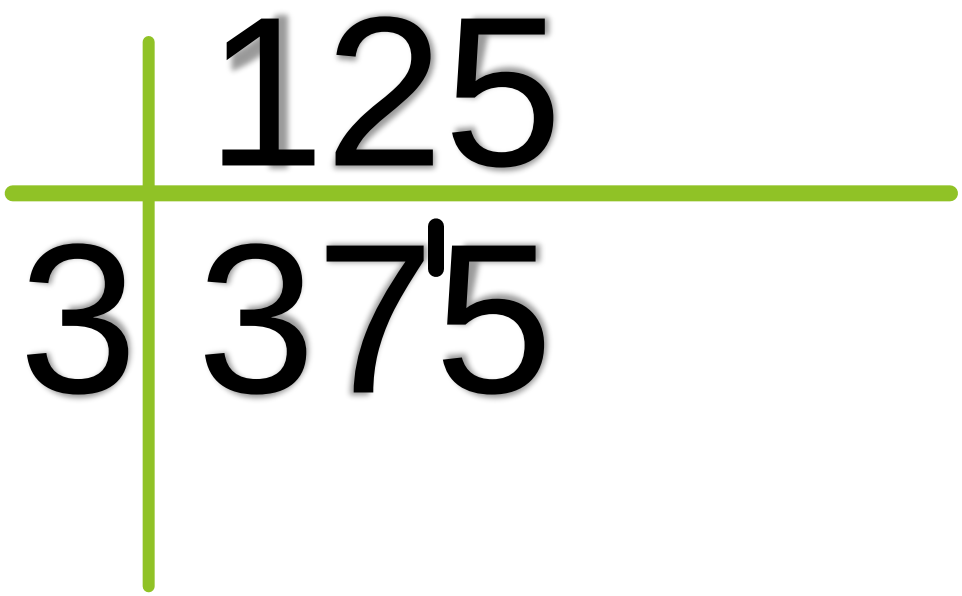




Division - KS2

375 divided by 3 =

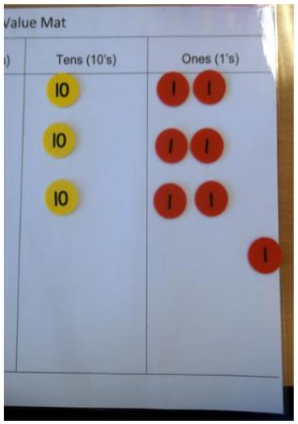
Pictorial Representation for this...



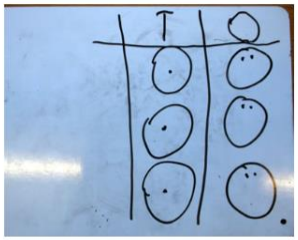
Division Build – up!

37 / 3

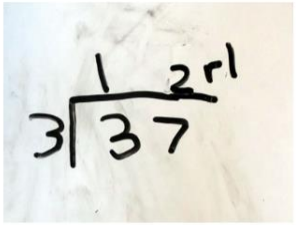
CONCRETE



PICTORIAL



ABSTRACT

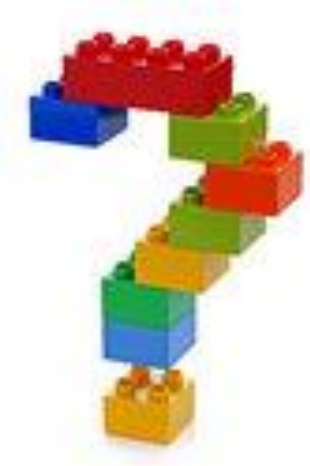


Making it real!

Problems and puzzles

- Problems do not have to be set in real-life contexts.
- Providing a range of puzzles and other problems helps pupils to reason strategically to:
  - find possible ways into solving a problem
  - sequence an unfolding solution to a problem
  - use recording to help their thinking about the next step.
- It is particularly important that teachers and teaching assistants stress such reasoning, rather than just checking whether the final answer is correct.
- All pupils need to learn how to solve problems from the earliest age – the EYFS early learning goals also include problem solving.

Any questions?



Useful Websites to support your child!

https://www.bbc.com/bitesize/subjects/zjxhfg8

https://www.topmarks.co.uk/maths-games/hit-the-button

https://www.multiplication.com/games/all-games

http://mathszone.co.uk/

Your turn….

On your tables you will find a variety of problems for you to have a go at. Try following the concrete-pictorial-abstract process, using the range of resources to help you.