

Children First Learning Partnership



Inspiring Excellence Together

Supporting my child in Maths The Concrete, Pictorial, Abstract Method



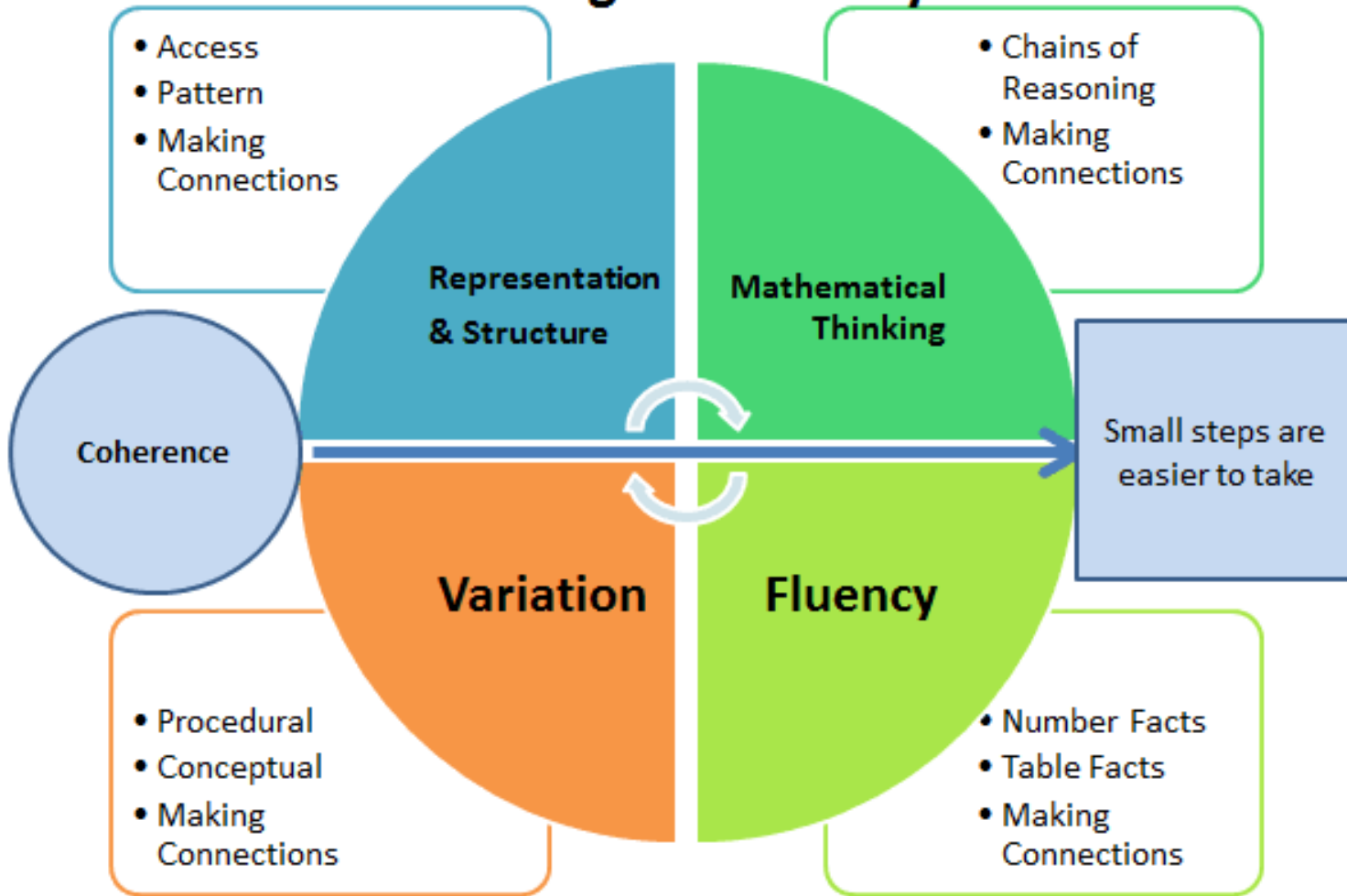
Why?

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.

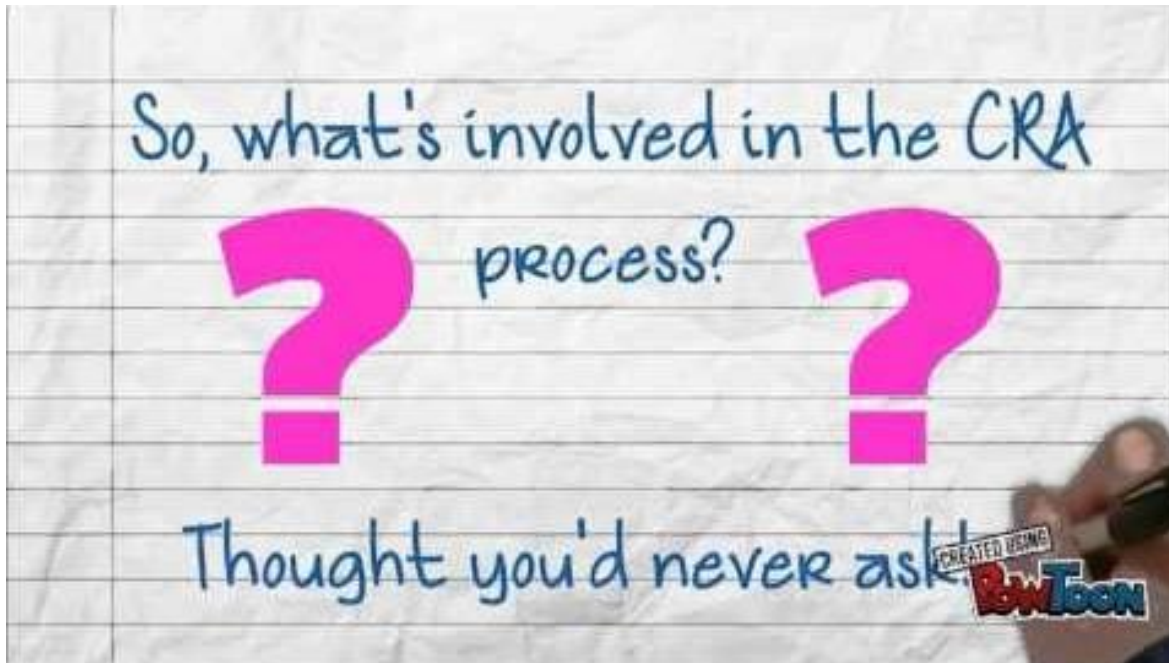
Teaching for Mastery



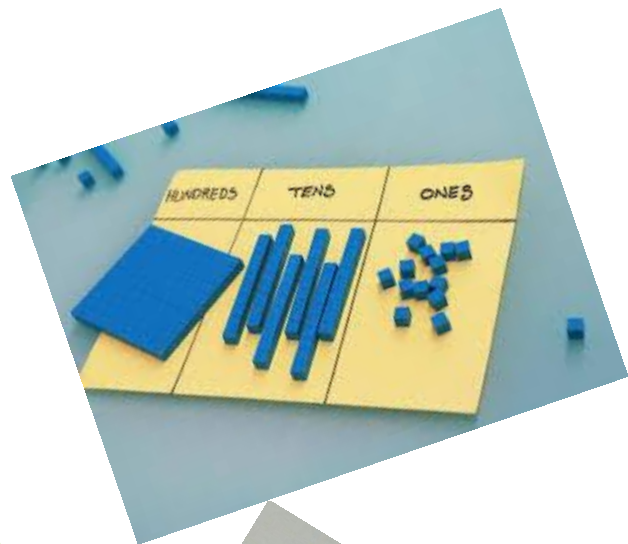
"Tell me and I forget.
Teach me and I remember
Involve me and I learn."

-Benjamin Franklin

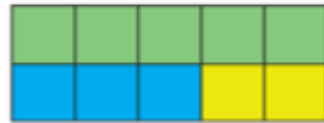
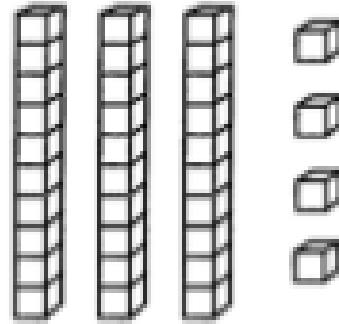
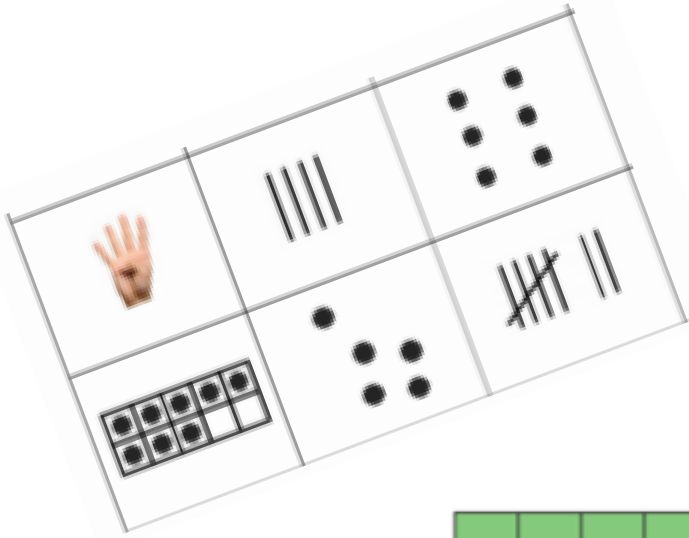
What is it?



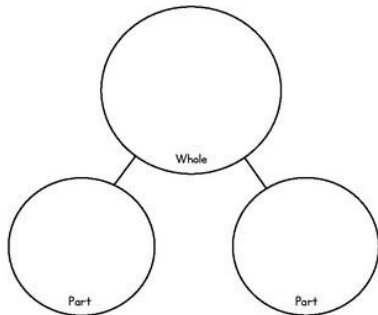
Concrete - getting hands on!



Pictorial Representation



5	
3	2



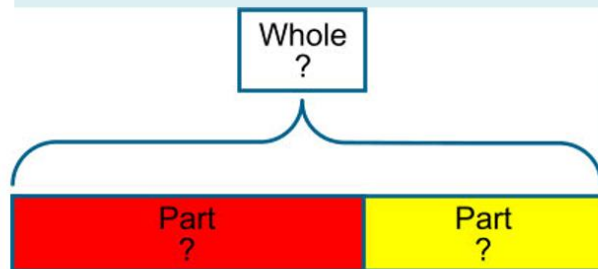
Concrete - Pictorial

Models, images and practical apparatus



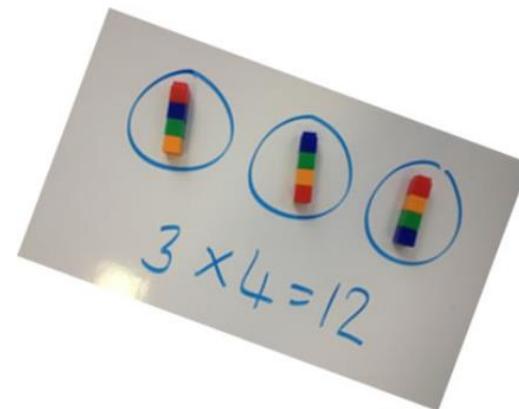
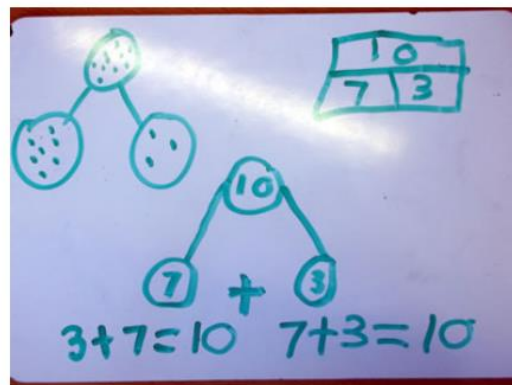
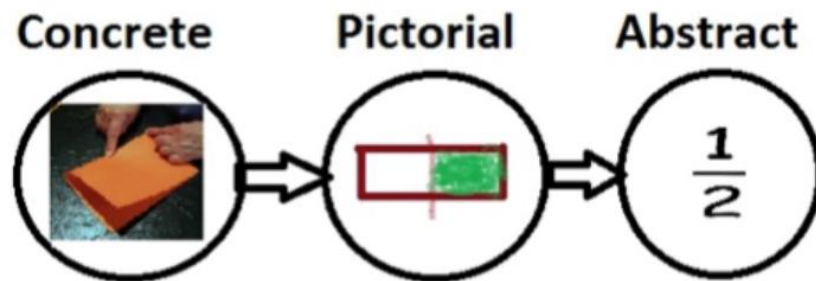
All of these play an important part in supporting pupils' conceptual understanding and reasoning skills.

Can you name these?



Flexibility with different representations is an important element of fluency.

Bringing 'concrete, pictorial, abstract' together:



Some examples of how CPA could work:

Resources

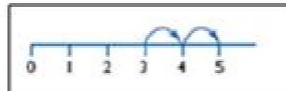
Resources to help build concepts



Numicon



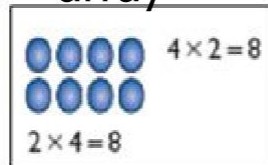
number line



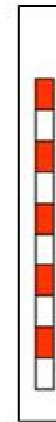
geoboard



array



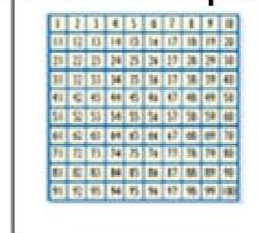
counting stick or metre rule



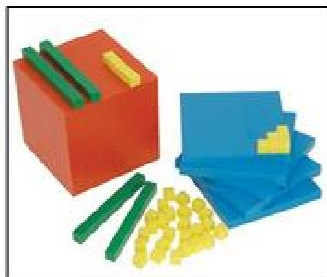
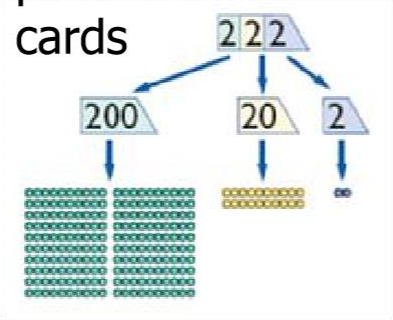
empty number line



hundred square

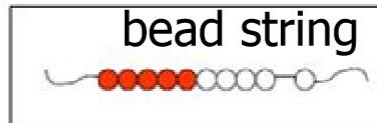


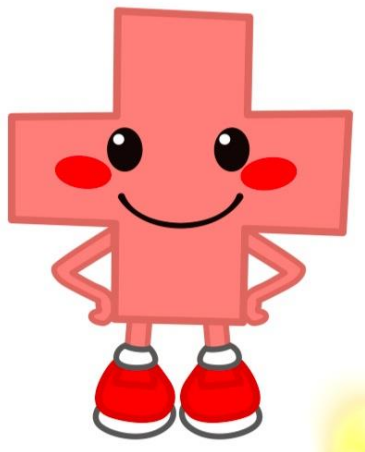
place value



Dienes blocks
base-ten blocks

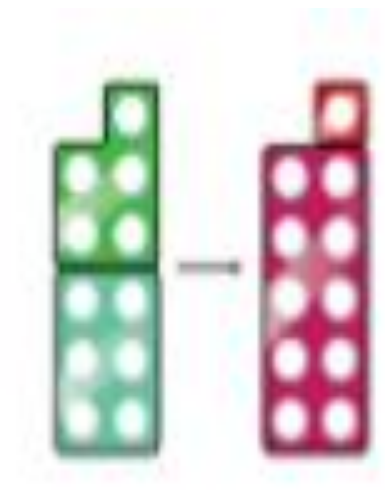
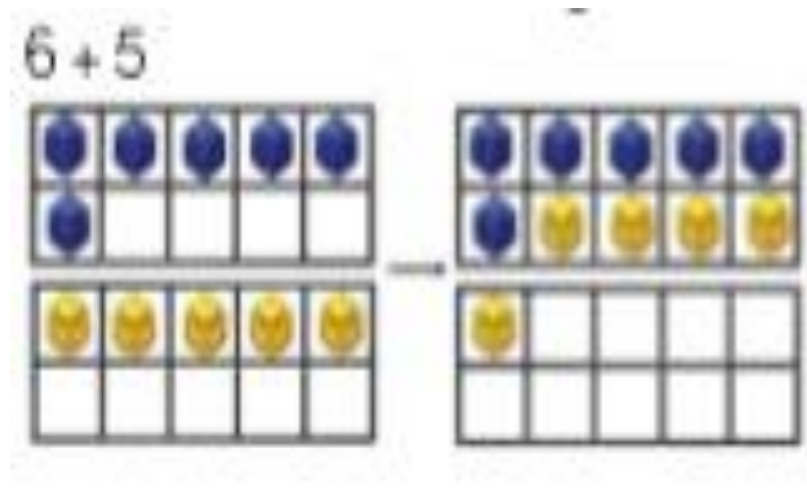
bead string



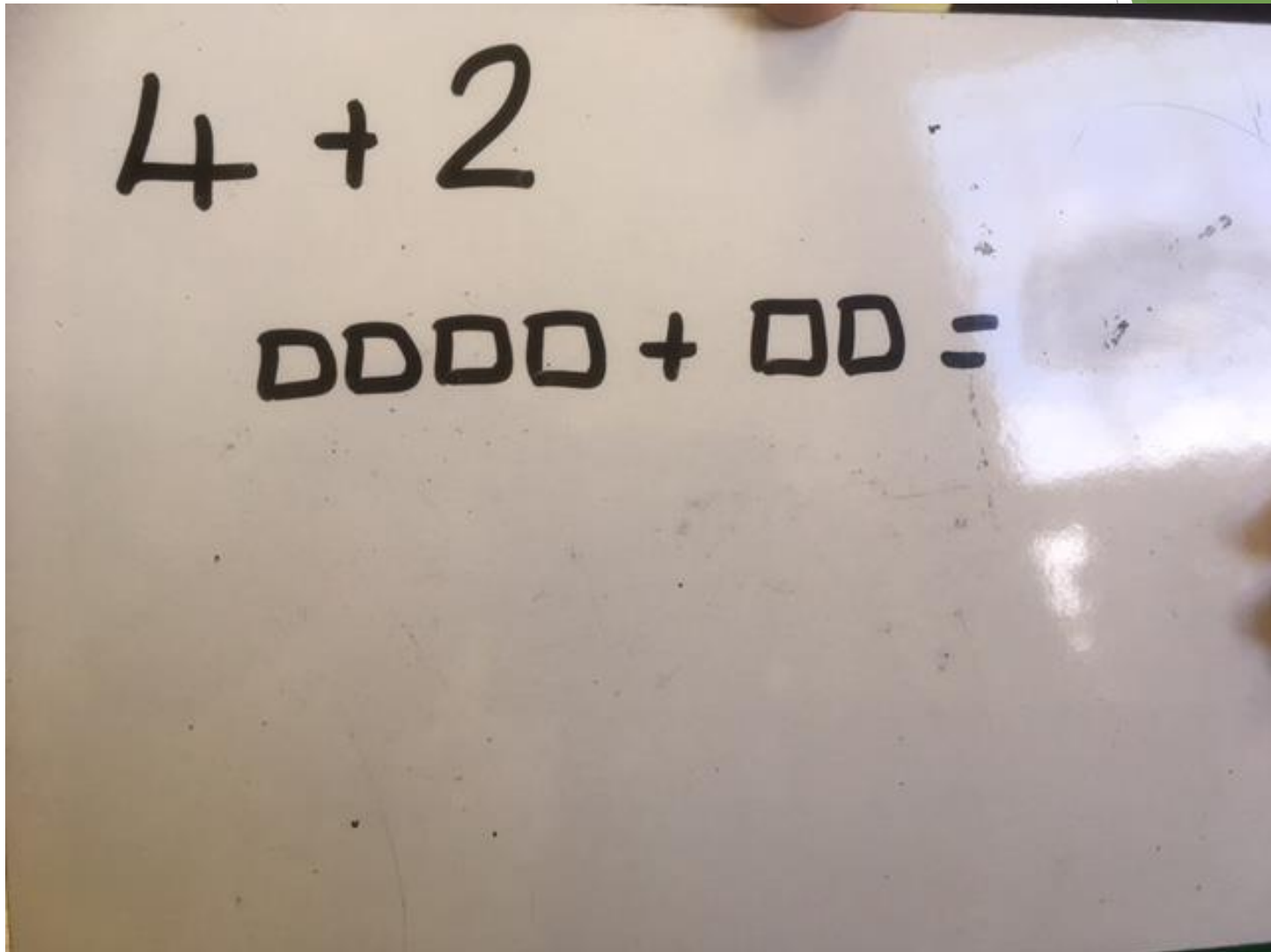


Addition - KSI

Concrete

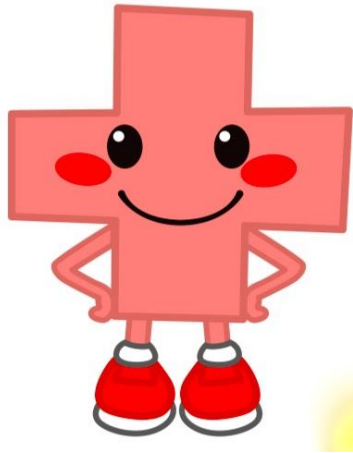


Pictorial Representation for this...



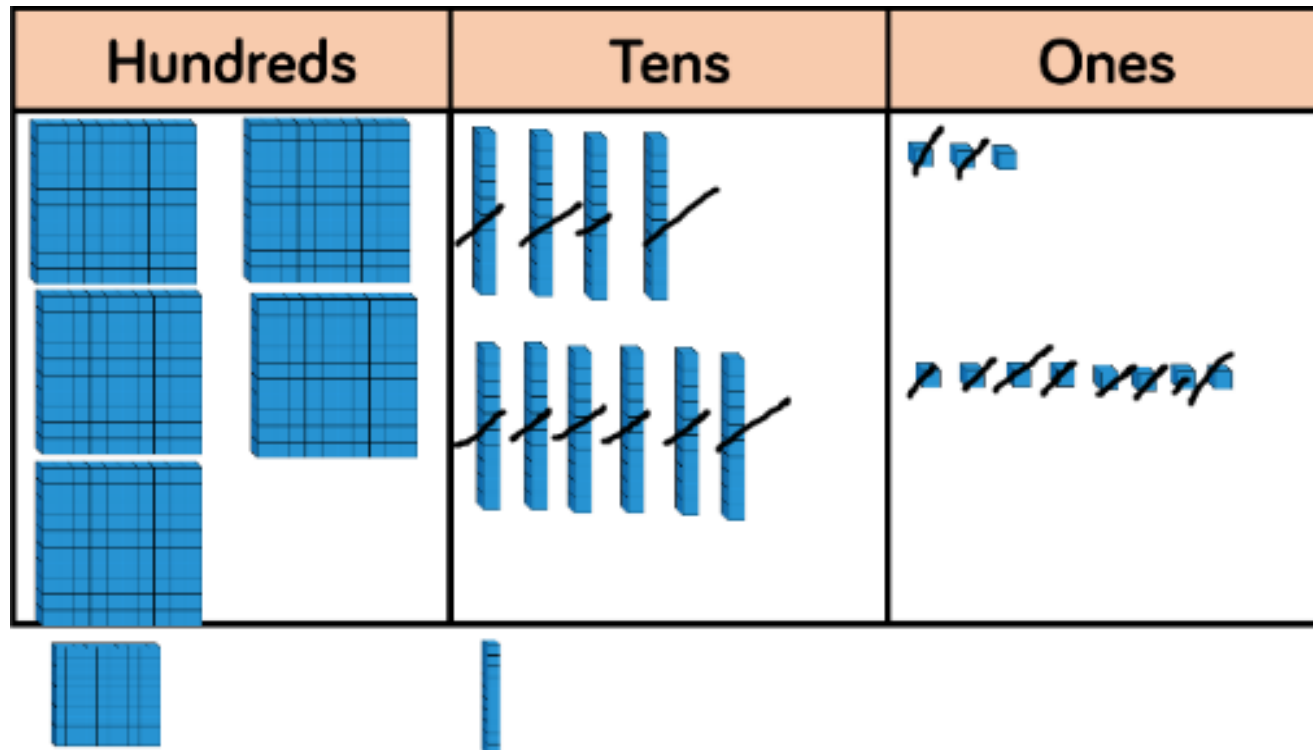
Abstract

$$\blacktriangleright 4 + 2 = 6$$



Addition - KS2

Concrete



Pictorial Representation for this...

$243 + 368 =$

100s	10s	1s
□□		///
□□□		///
□		
6		

The diagram shows a pictorial representation of the addition $243 + 368$. It is organized into three columns representing place values: 100s, 10s, and 1s. The 100s column contains two rows of squares (representing 200 and 400) and one square (representing 600). The 10s column contains two rows of vertical bars (representing 40 and 60) and one bar (representing 10). The 1s column contains two rows of diagonal slashes (representing 3 and 8) and one slash (representing 1). The final row shows the sum: 6 in the 100s column, 1 in the 10s column, and 1 in the 1s column.

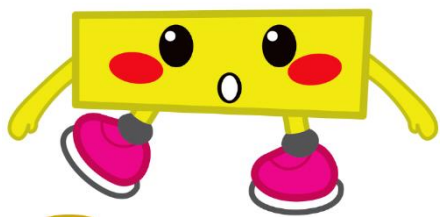
Concrete

▶ 243+

368

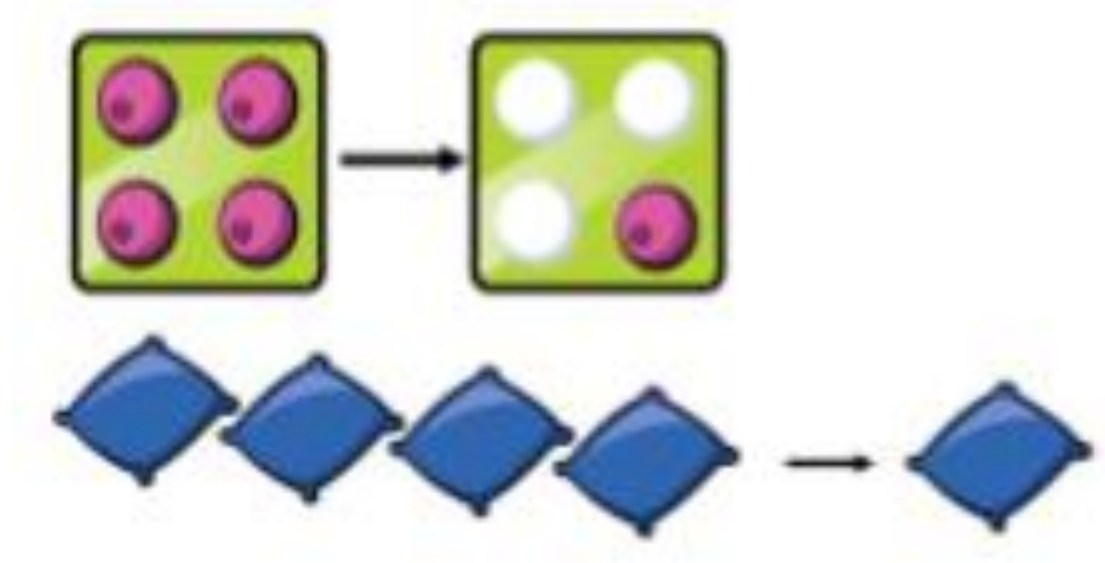
613

11

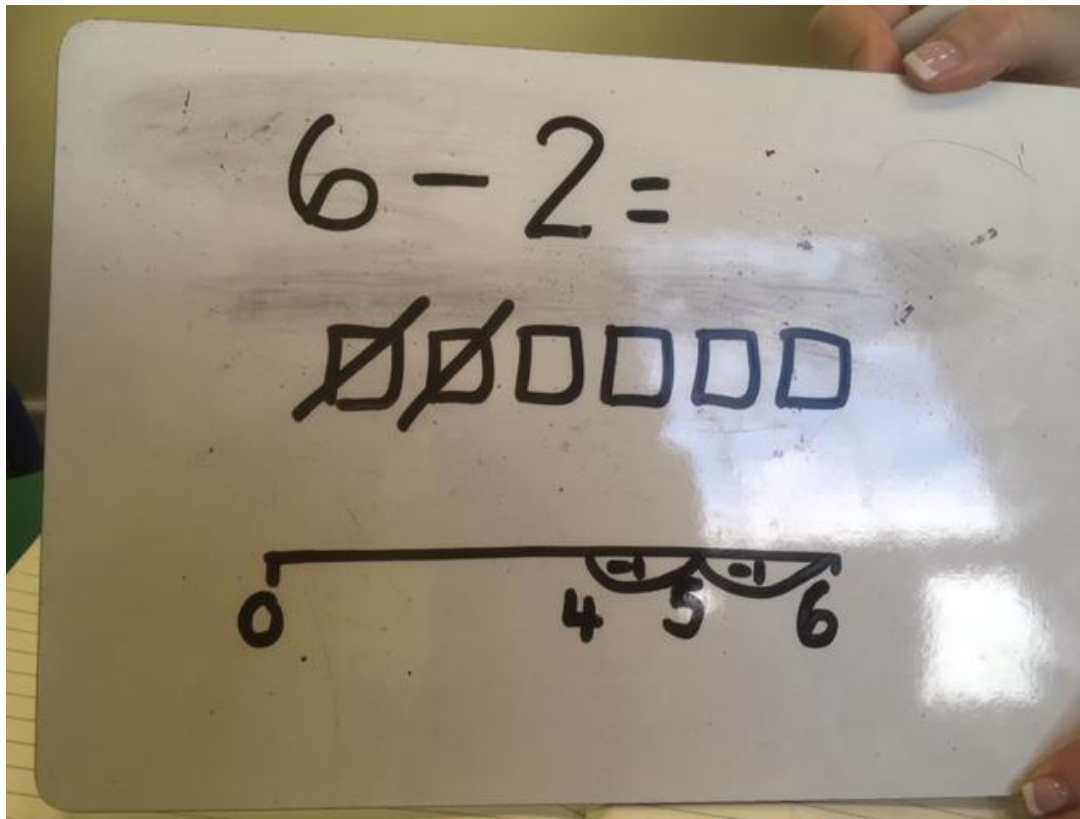


Subtraction - KSI

Concrete

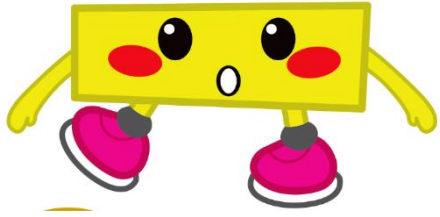


Pictorial Representation for this...



Concrete

$$6 - 2 = 4$$



Subtraction - KS2

$$234 - 88$$

100s	10s	1s
●●	●●●	●●●●



100s	10s	1s
●	●●●●●●●●	●●●●●●●●●●●●



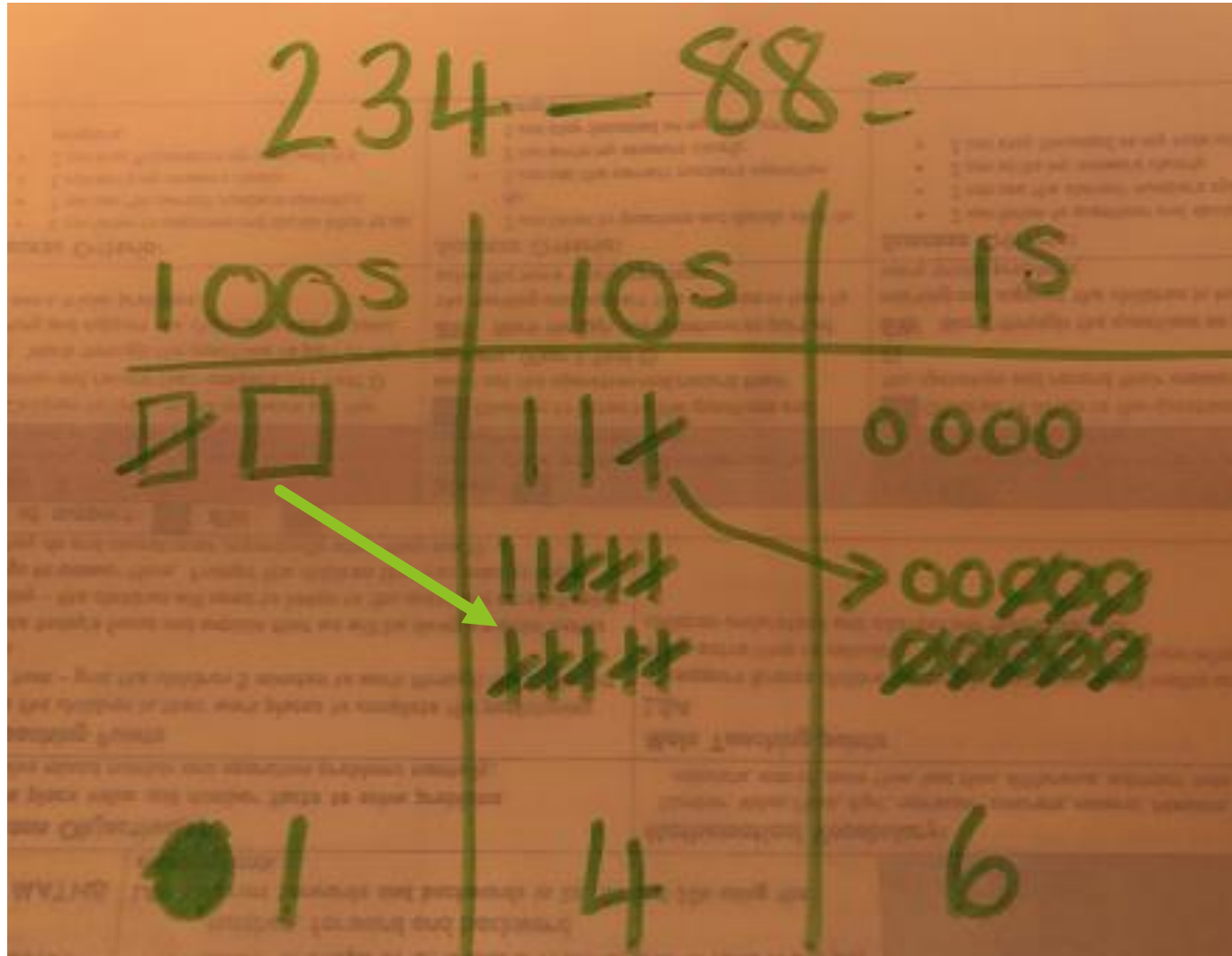
100s	10s	1s
●	●●●●	●●●●●●●●

1

4

6

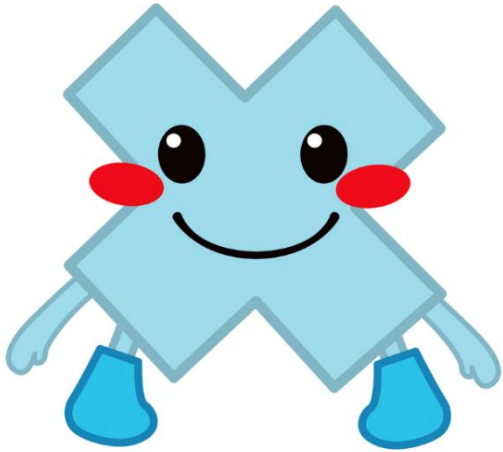
Pictorial Representation for this...



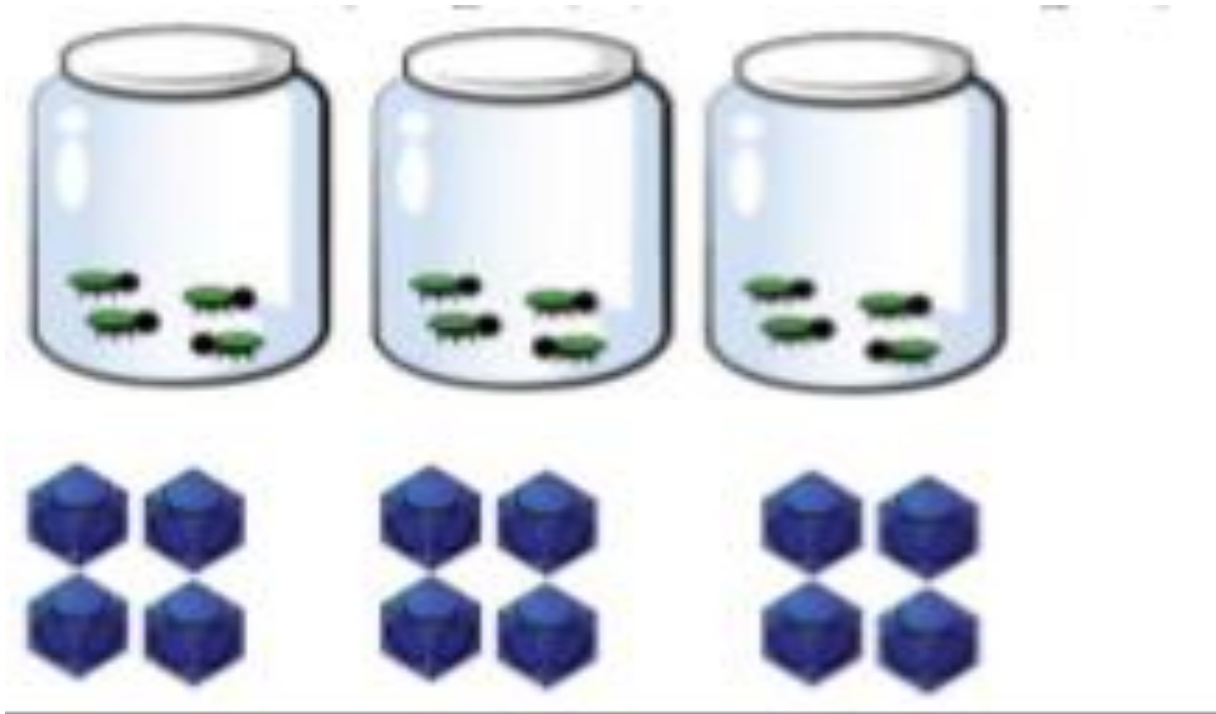
Abstract

$$\begin{array}{r} 2\overset{2}{3}4 \\ - \quad 88 \\ \hline 6 \end{array}$$

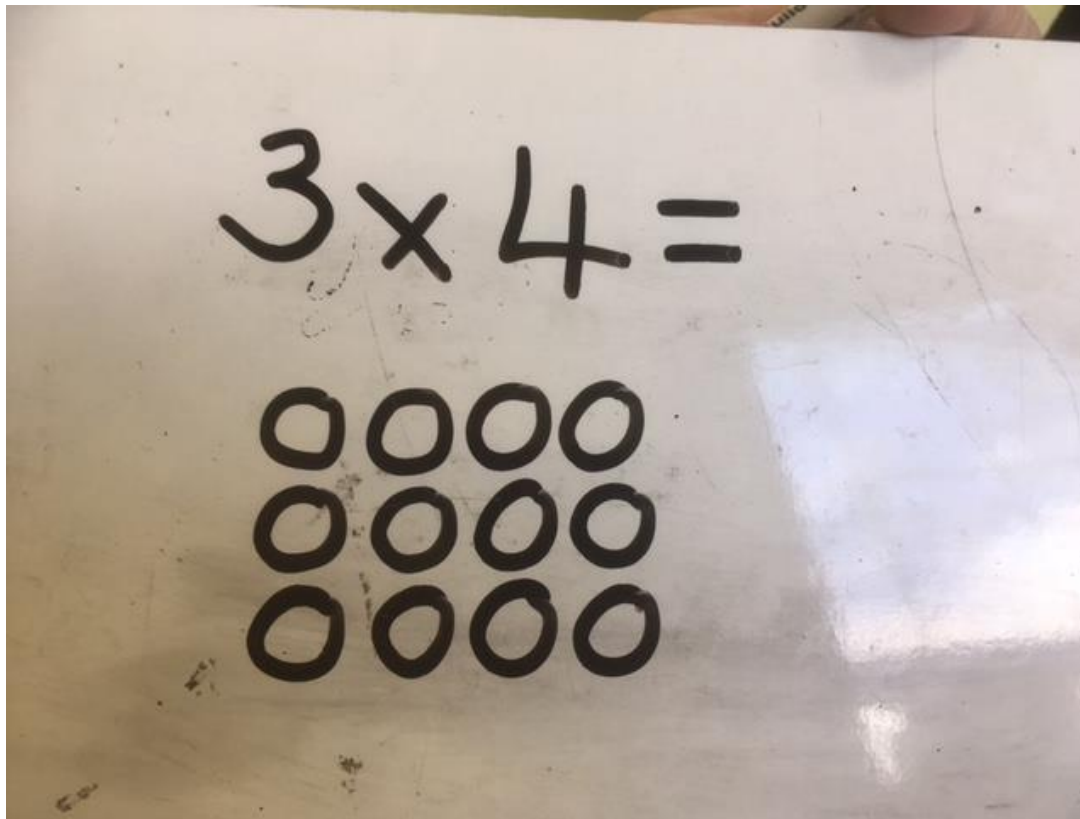
Multiplication - KS1



Concrete



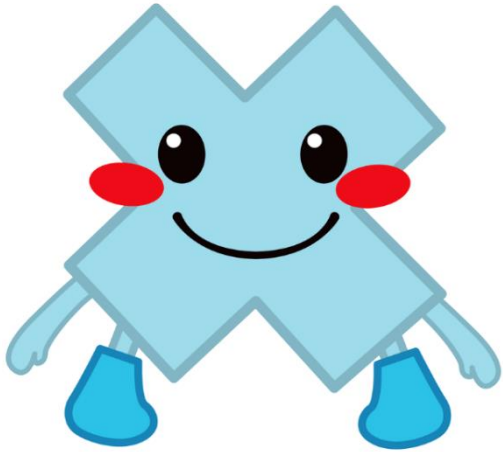
Pictorial Representation for this...



Concrete




$$3 \times 2 = 6$$

Multiplication - KS2



100s	10s	1s
		



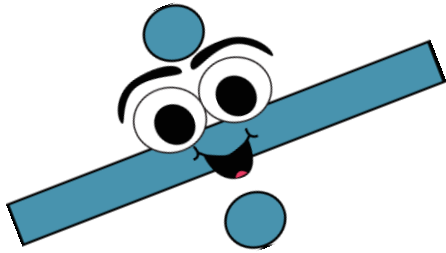
100s	10s	1s
		

Abstract

x	20	3
6	120	18

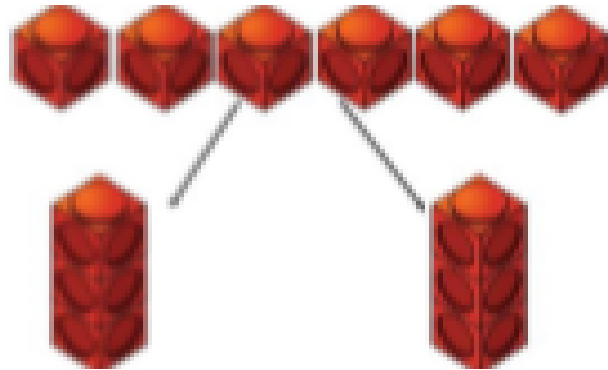
$$\begin{array}{r} 120 + \\ \underline{18} \\ \underline{138} \end{array}$$

$$\begin{array}{r} 23 \times \\ \underline{6} \\ 120 \\ \underline{18} \\ \underline{138} \end{array}$$



Division - KSI

Concrete

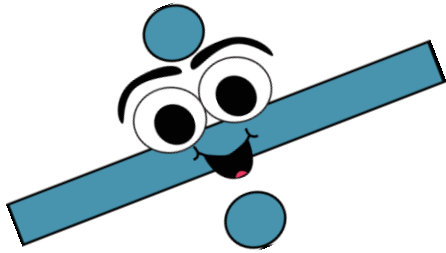


$$6 \div 3 =$$



Concrete


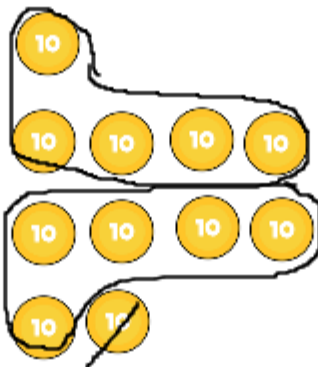
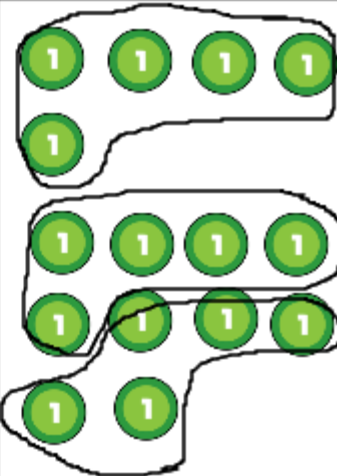
$$6 \div 3 = 2$$



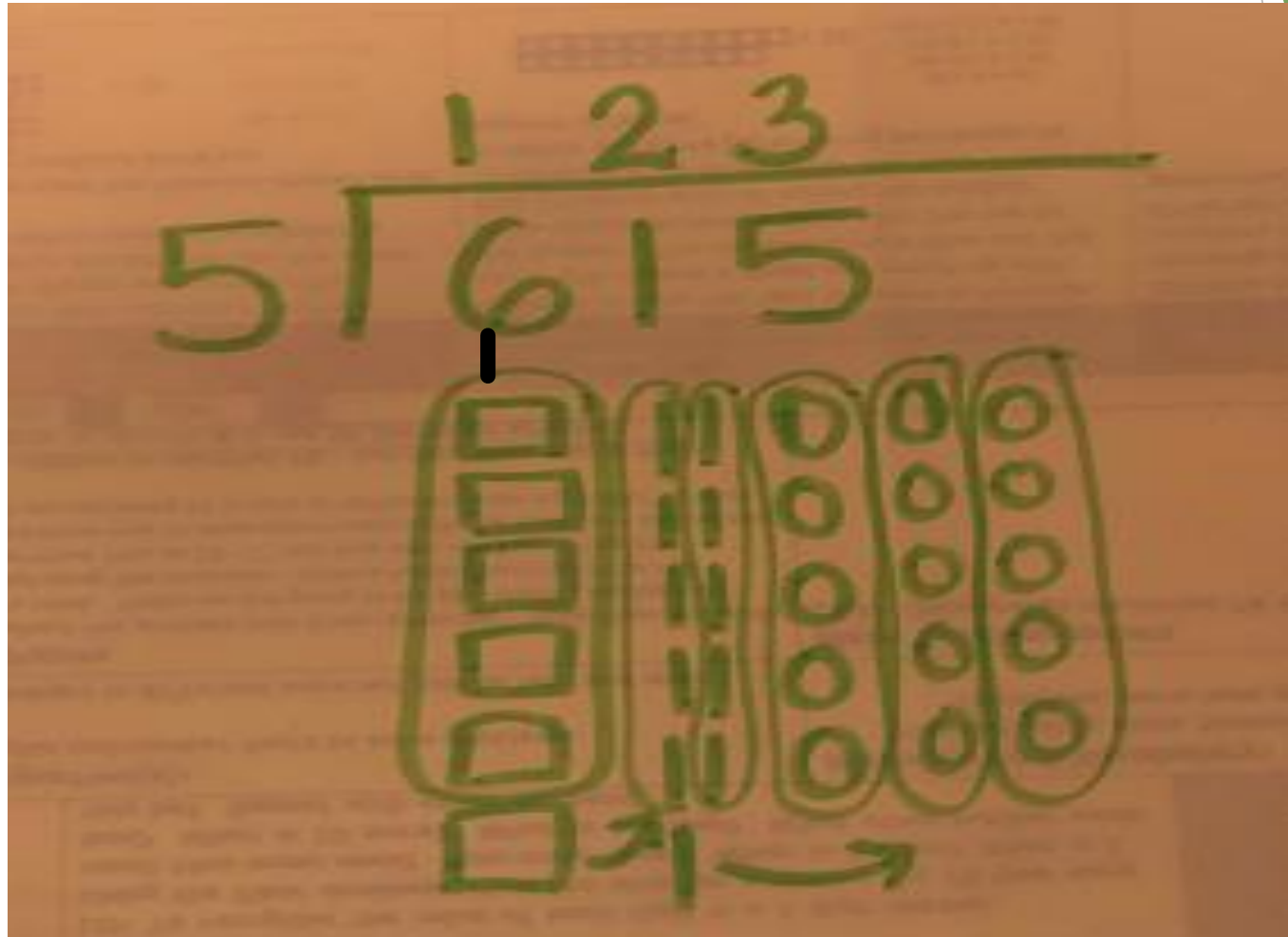
Division - KS2

Concrete

$$615 \div 5 =$$

H	T	O
		

Pictorial Representation for this...

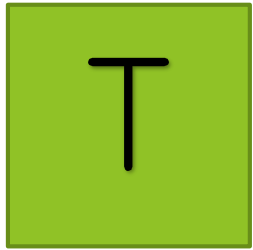


123

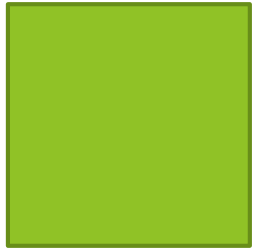
5

6¹1¹5

Value Symbols to use in pictorial representation



Thousands



Hundreds



Tens



Ones

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.

Useful Websites to support your child!

BBC Sign in

Bitesize

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



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

 multiplication.com

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



<http://mathszone.co.uk/>

<https://www.timestables.co.uk/>