Supporting your child in Maths

Jo Cronin
Freelance Maths Consultant

Mathstopia

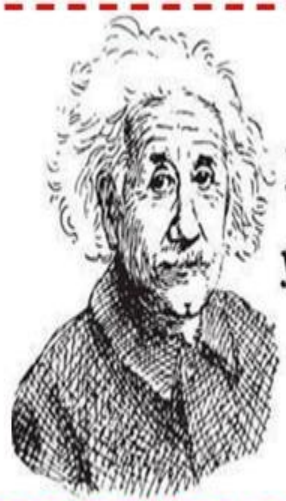
What is mastery?

Procedural fluency

I know **what** to do...

Conceptual understanding

I know **what** to do and **why** I'm doing it!

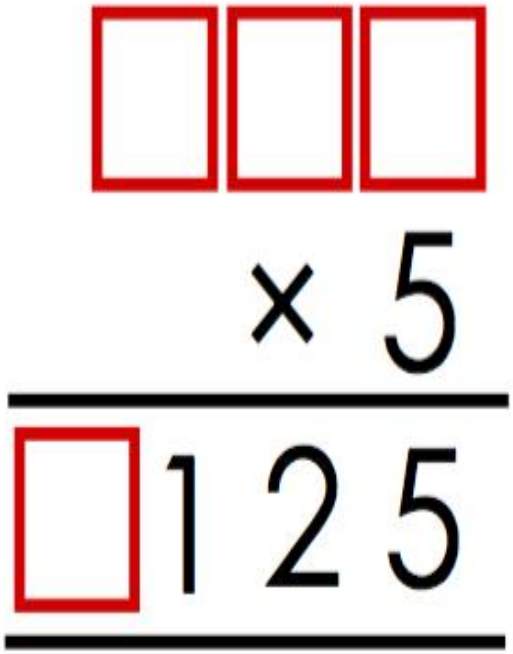


If you can't explain it to a six year old, you don't understand it yourself.

Albert Einstein

Mathstopia

How many ways?



Fill in the missing digits.

Level 1: I can find a way

Level 2: I can find different ways

Level 3: I know how many ways there are

Research

- Research has shown that parental involvement has a significant impact on a child's development of number skills.
- Sadly many adults feel anxious when talking about the topic of mathematics and lack confidence.

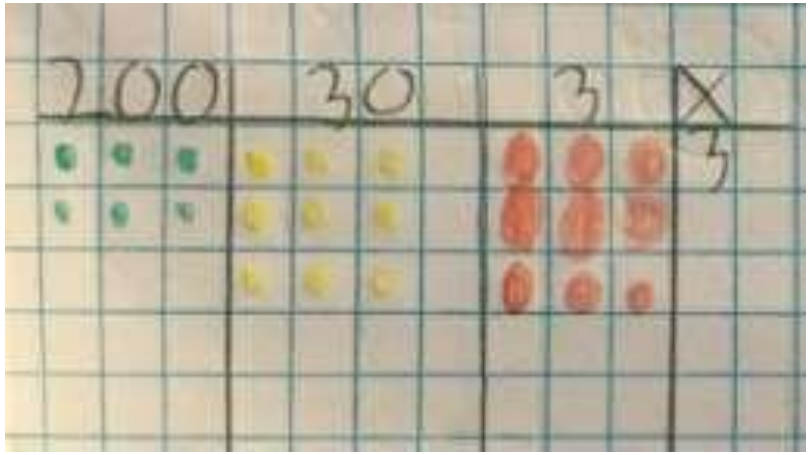
Mathstopia

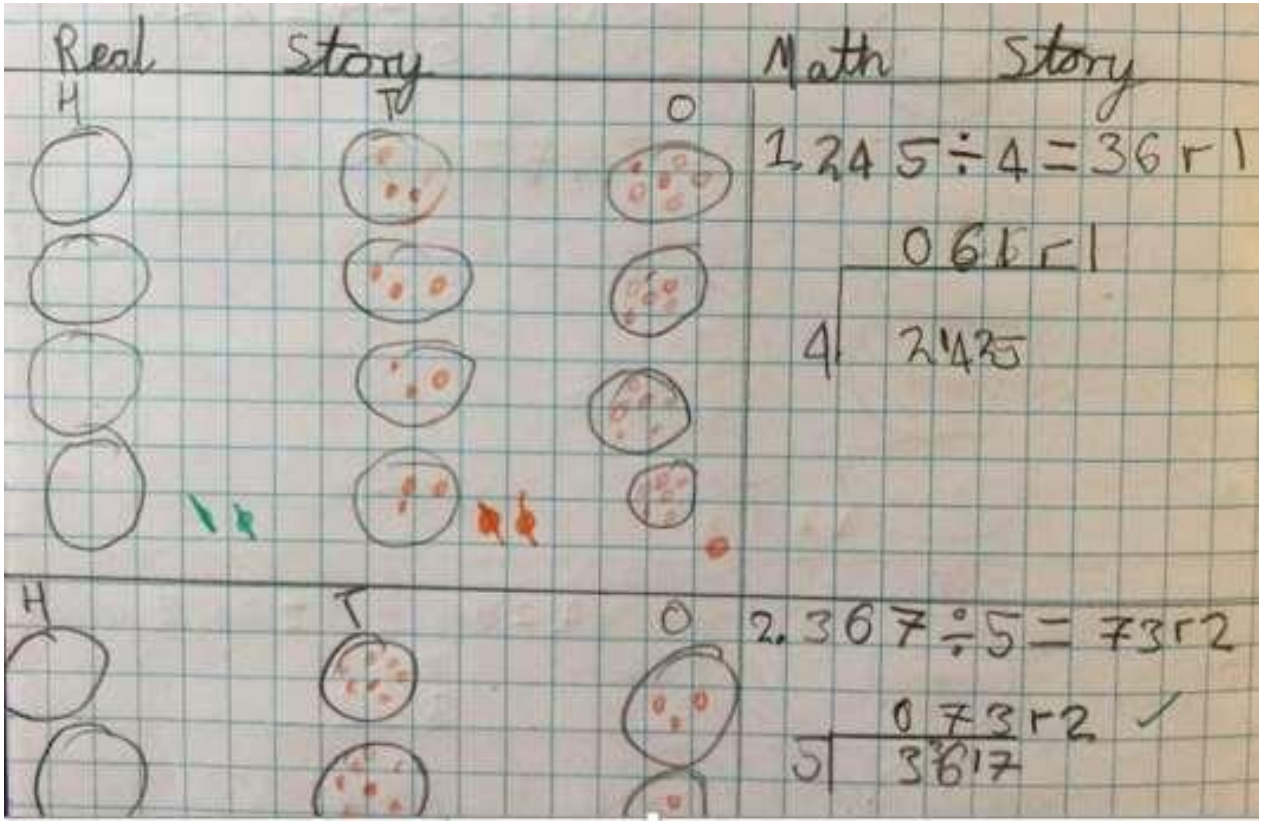
The ‘doing’ stage.

Concrete

The ‘seeing’ stage.

Pictorial

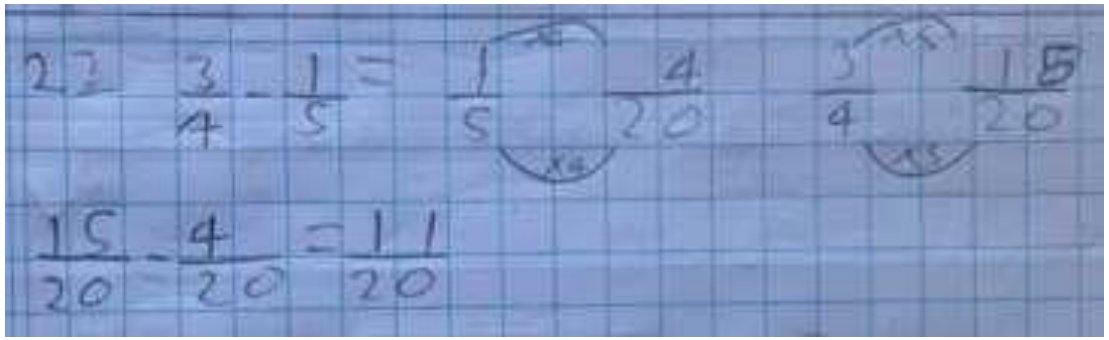


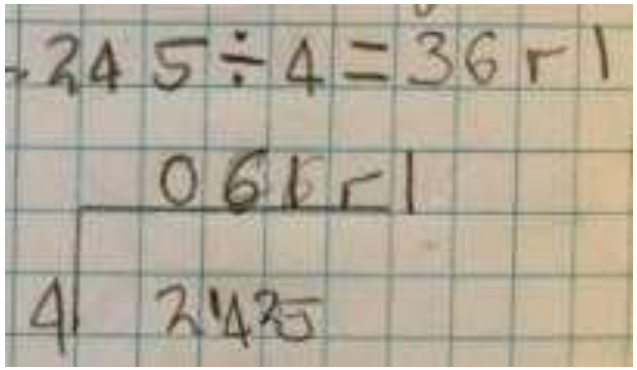


Mathstopia

Abstract

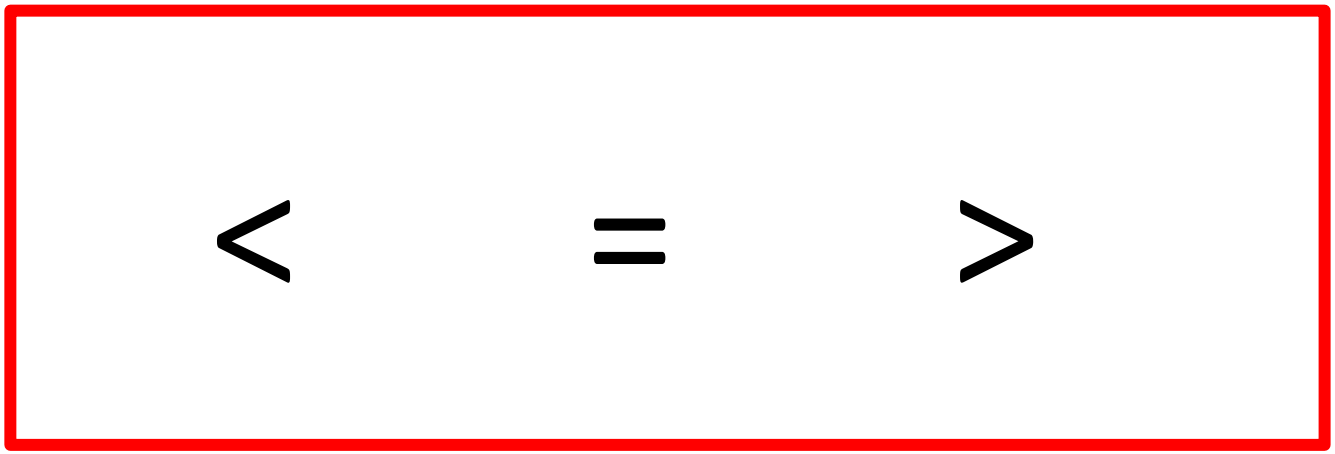
The ‘symbolic’ stage.





Mathstopia

7 SYMBOLS NOT 5



X

÷

−

+

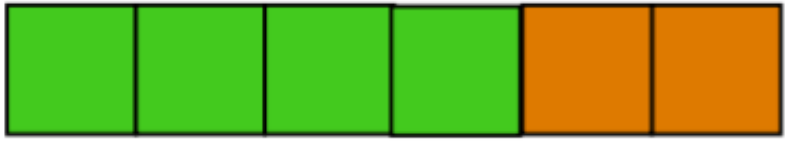
Magic words

- More
- Less
- Altogether

All you need:

Mathstopia

How Many Altogether?

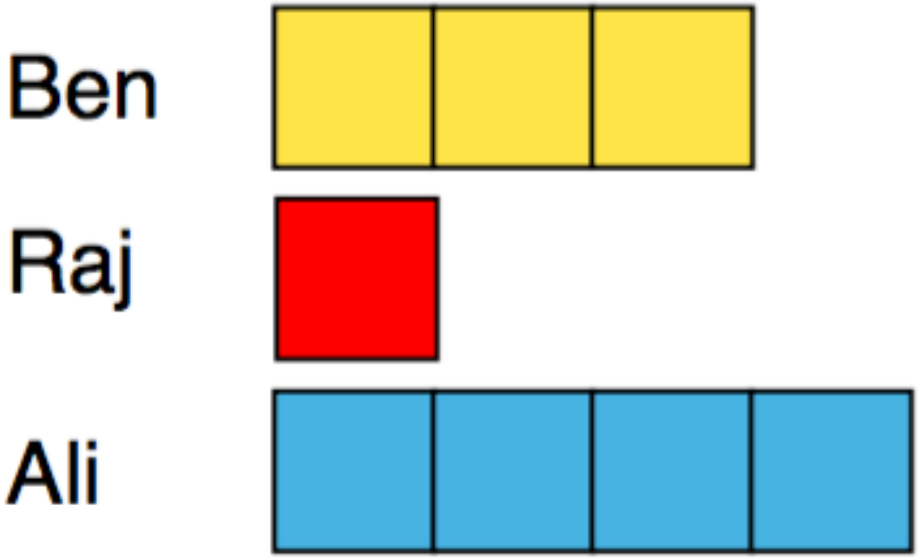


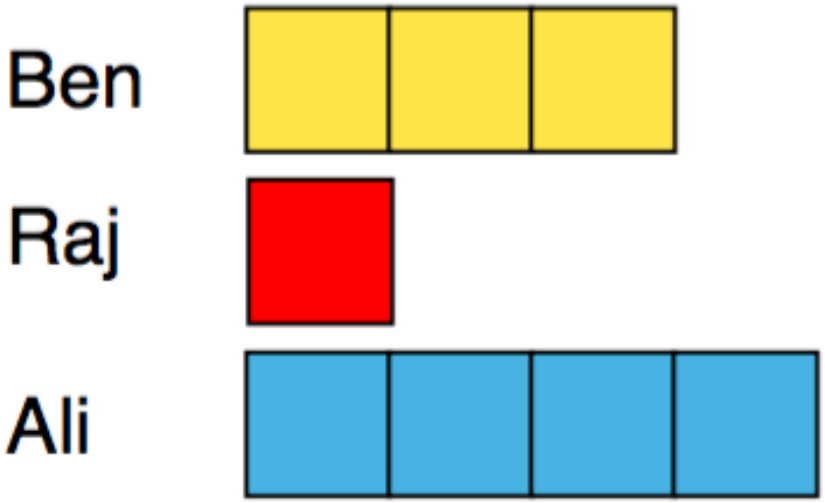
•Will: “I have four”
Ali: I have two”
Will: “Four add two equals six” Ali: “Altogether we have six”.

•They could move into groups of three, and combine all three sticks before their conversation.

More or Less

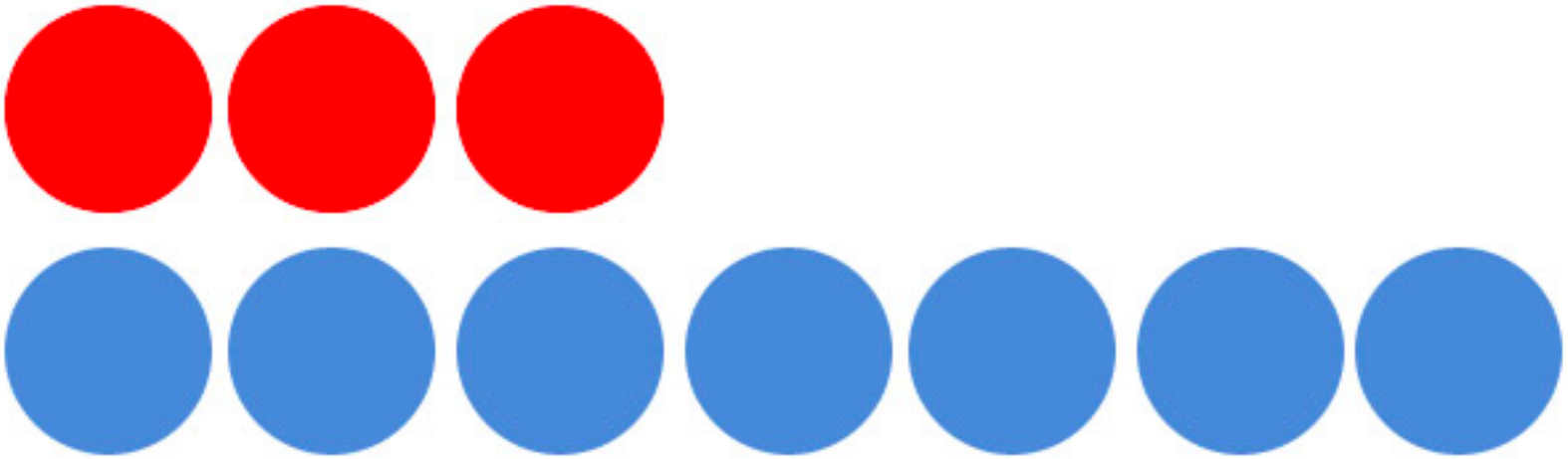
- Put children into groups of 3, with a dice and a set of 6 different coloured cubes each.



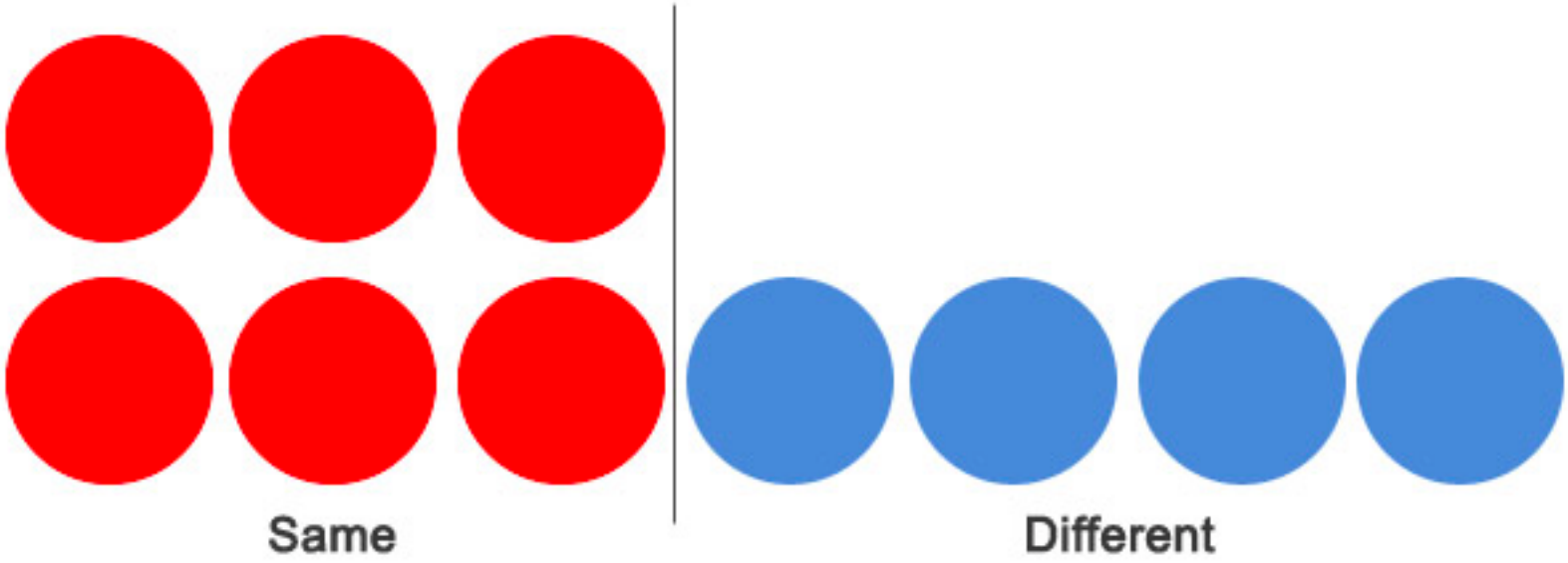


- Ben “I have two more than Raj”
- Ali: “ I have three more than Raj”
- Raj: I have two less than Ben”
- Ben: “I have one less than Ali” - and so on.

Difference

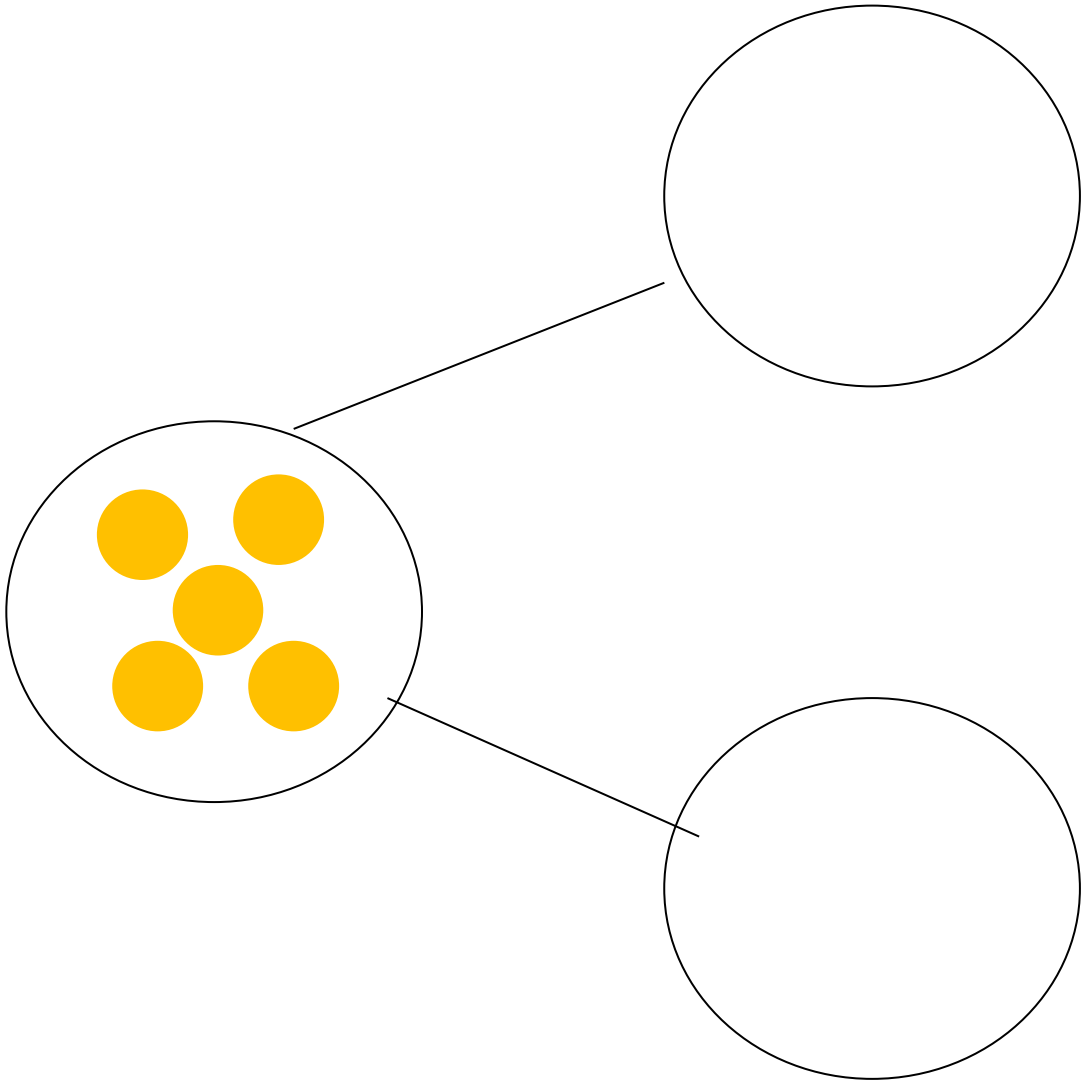


What's the same, what's different?

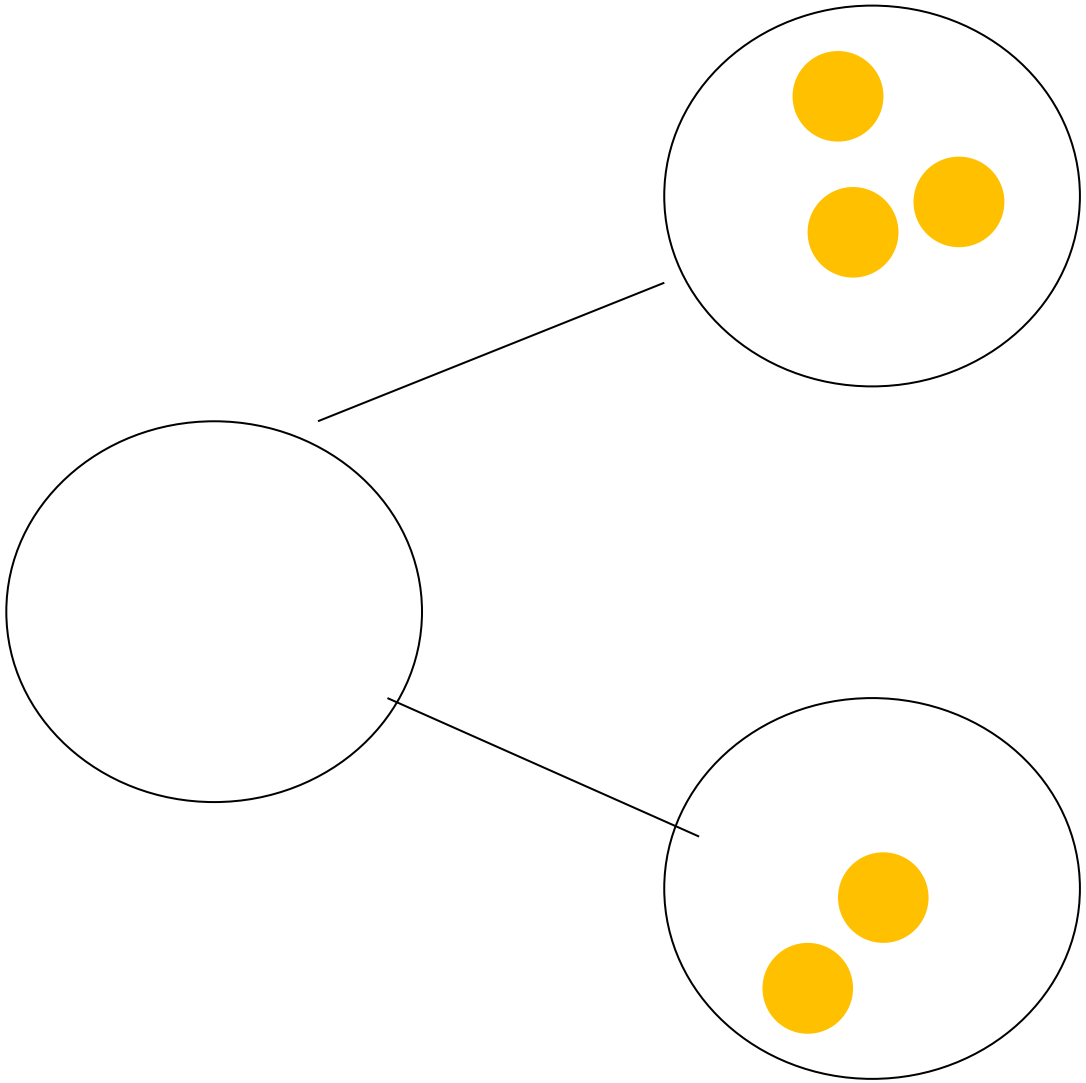


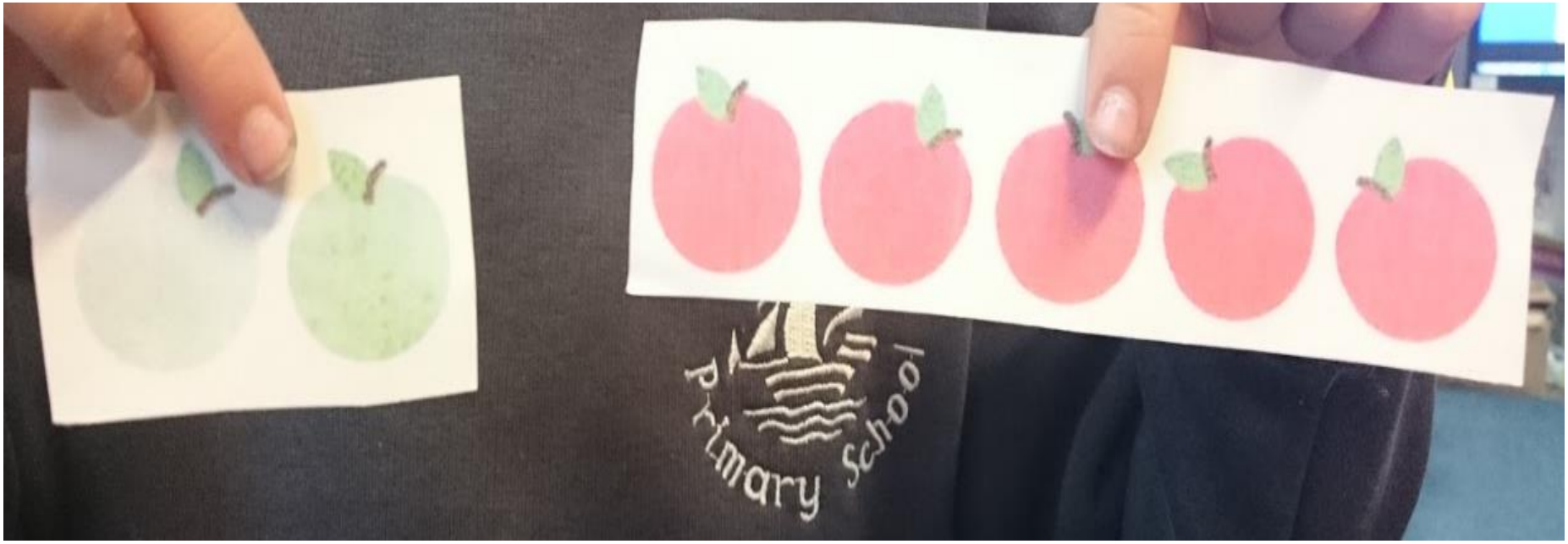
Mathstopia

Part Whole Relationships



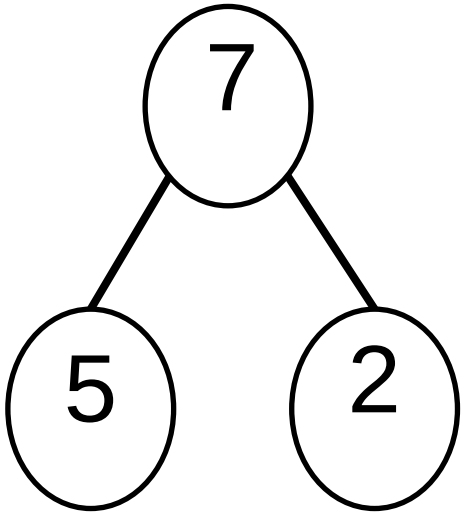
Part Whole Relationships





$2 + 5 = 7$

$5 + 2 = 7$

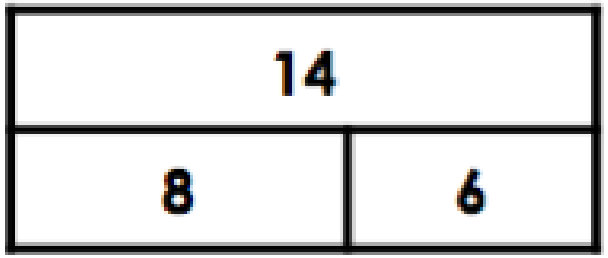


$7 - 2 = 5$

$7 - 5 = 2$

True or false? ✓ ✗

$8 + 6 = 14$ ✓



$8 - 6 = 14$

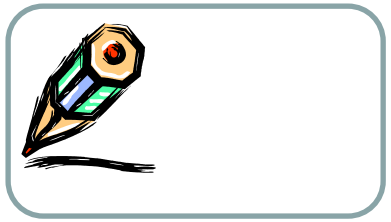
$14 = 8 + 6$

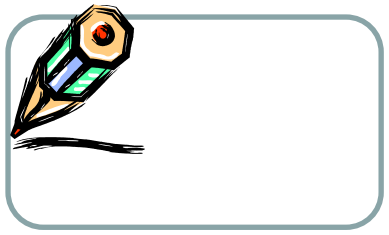
$8 = 14 - 6$

$14 - 6 = 8$

$8 = 6 + 14$

 + 3.7 = 7.0

2.8 +  = 9.5

 - 3.8 = 2.5

10.3 -  = 6.5

Understanding and Using Calculations

For all calculations, children need to:

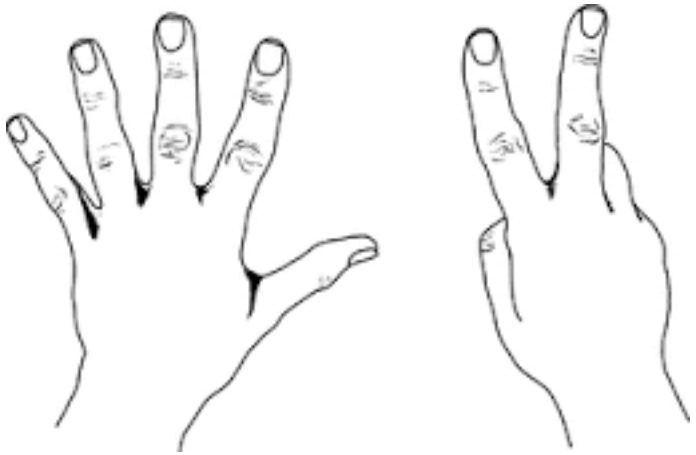
- Understand the = sign as **is the same as**, as well as **makes** and **equals**.
- See calculations where the equals sign is in different positions and what these number sentences represent, e.g. 3 + 2 = 5 and 5 = 7 - 2.
- Decide on the most appropriate method i.e. mental, mental with jottings or written method (calculator use no longer tested after this year).
- Estimate before calculating and check whether or not their answer is reasonable.

Number Sense!

Children need to understand our number system, starting with counting numbers, building an understanding of how our numbers work and fit together. This includes exploring place value and comparing and ordering numbers then applying this understanding in different contexts.

Mathstopia

Try asking your reception or Year one children to show you 7 on their fingers.

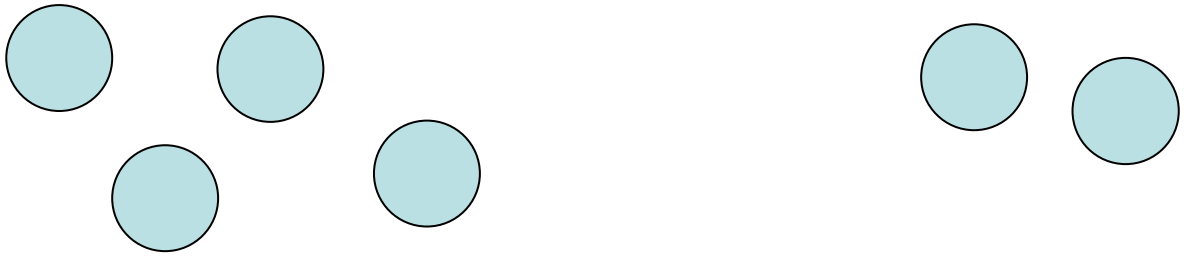


Now spot the pupils who don't have 5 as a benchmark to find 7.

Mathstopia

Counting All

Using practical equipment to count out the correct amount for each number in the calculation and then combine them to find the total, e.g. 4 + 2



Work out the answers to:

E + B

C + B

E + A

E + C

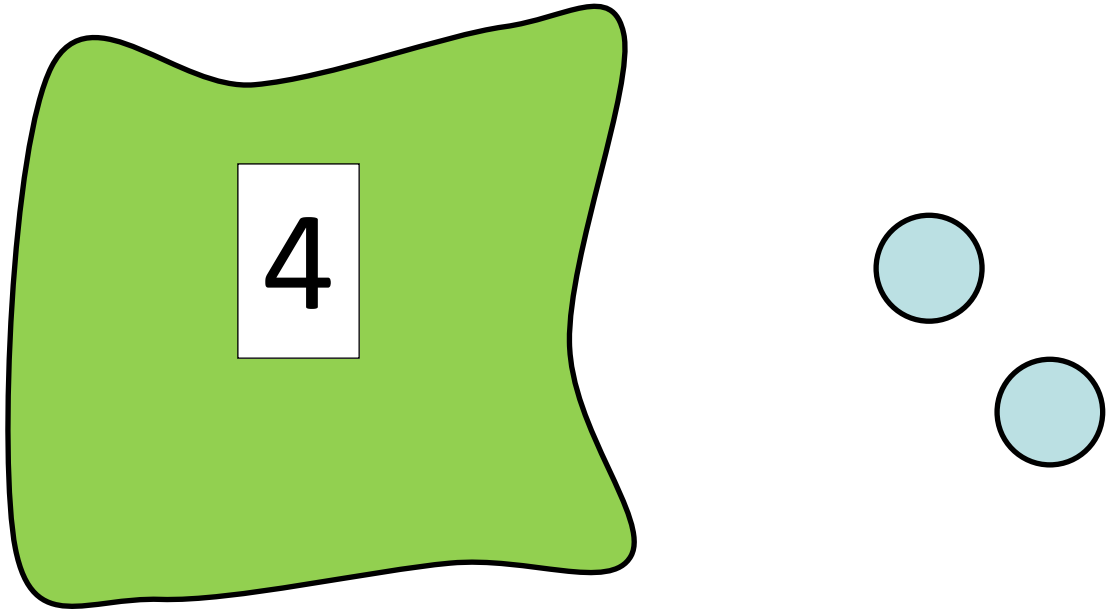
D + B

G + D

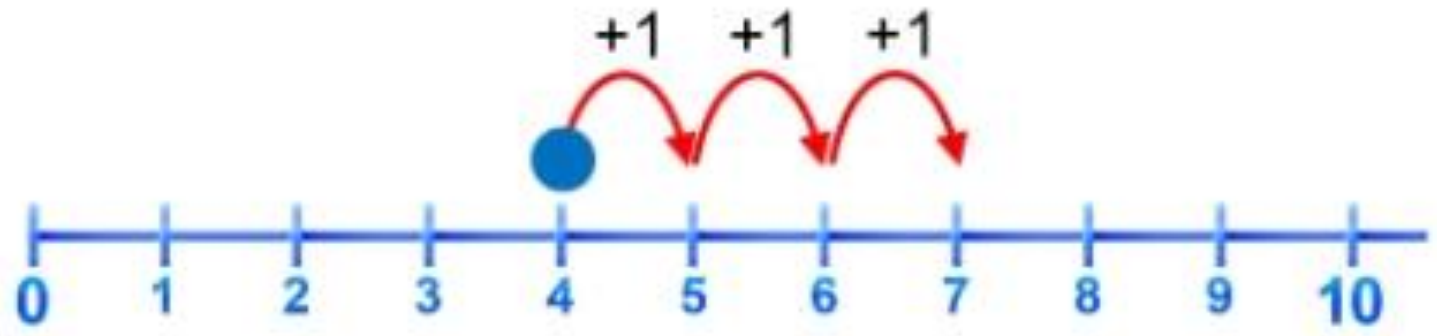
When did you count all, and when did you count on? Why?

From Counting All to Counting On

To support children in moving from counting all to counting on, have two groups of objects but cover one so that it can not be counted, e.g. 4 + 2



The number line can be introduced

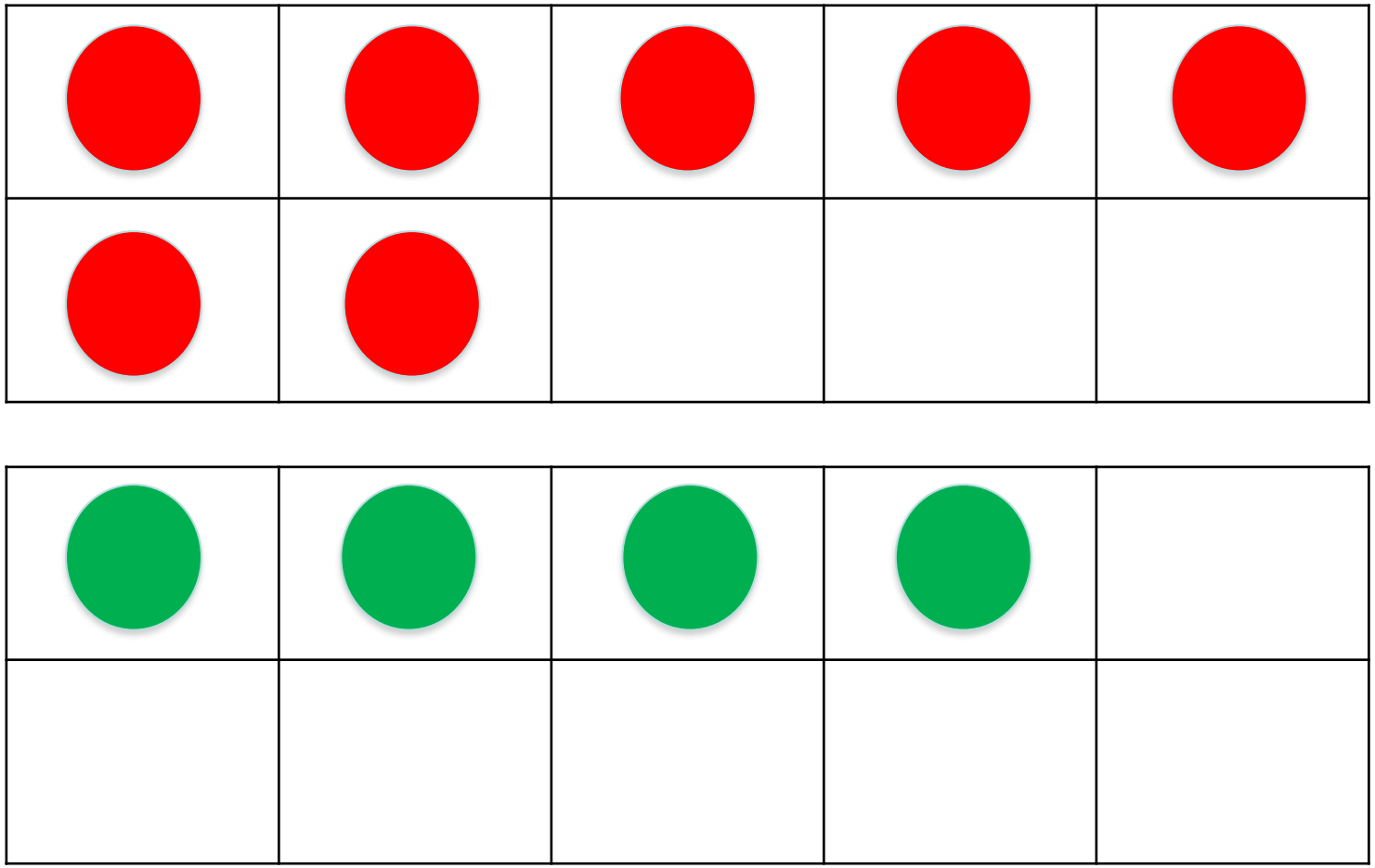


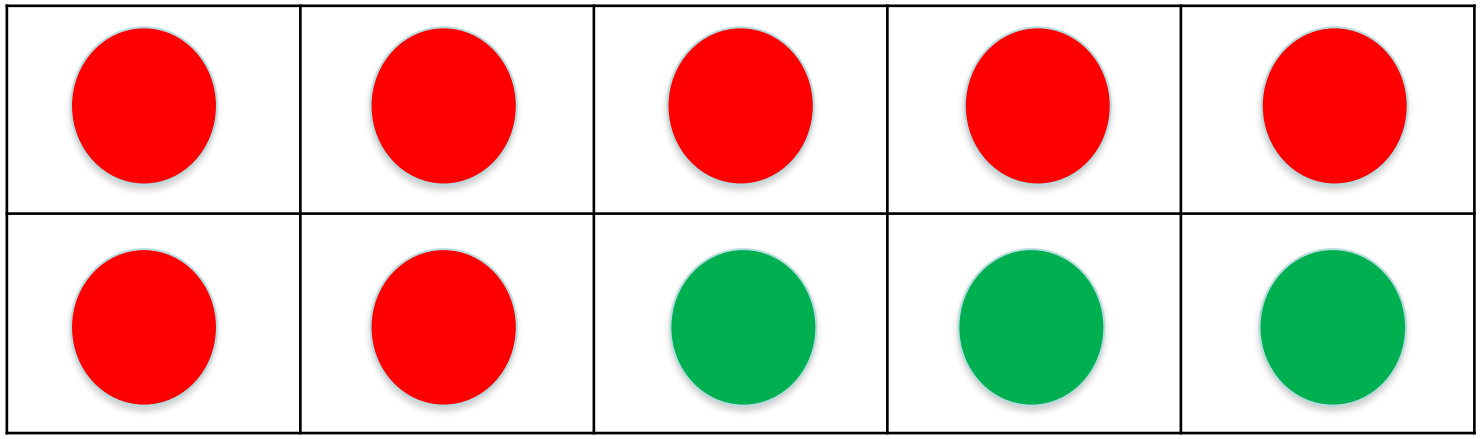
The answer is the number where you end up.

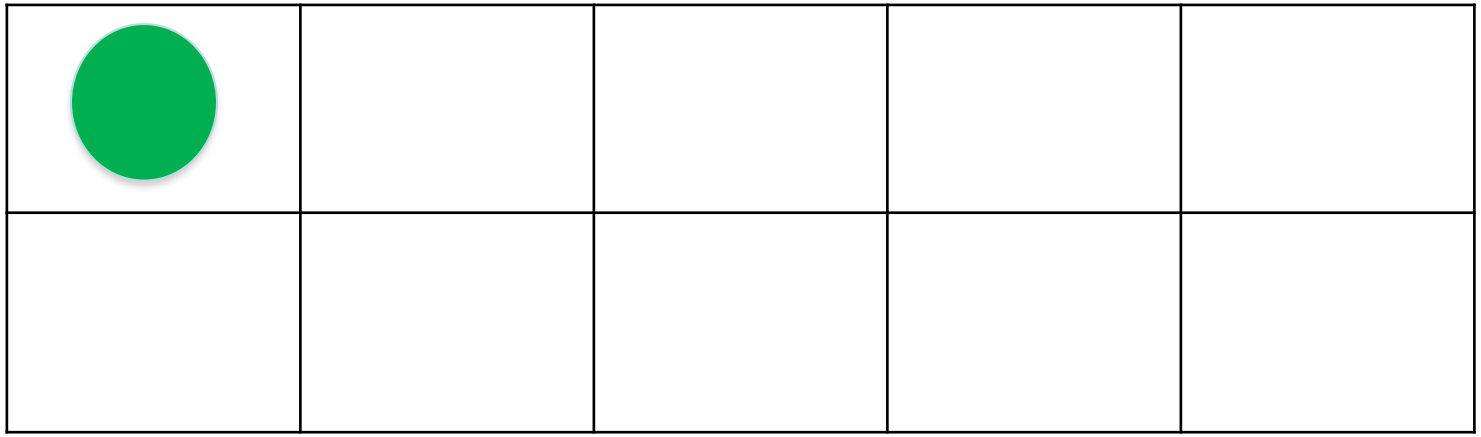
$$4 + 3 = 7$$

Mathstopia

Calculate 7 + 4 =

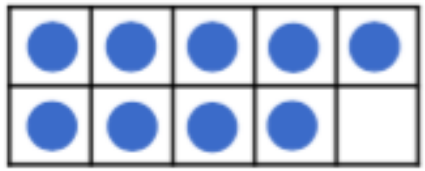


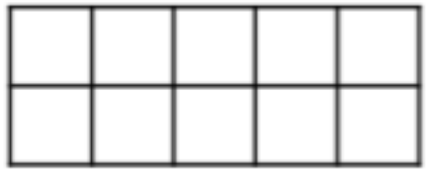


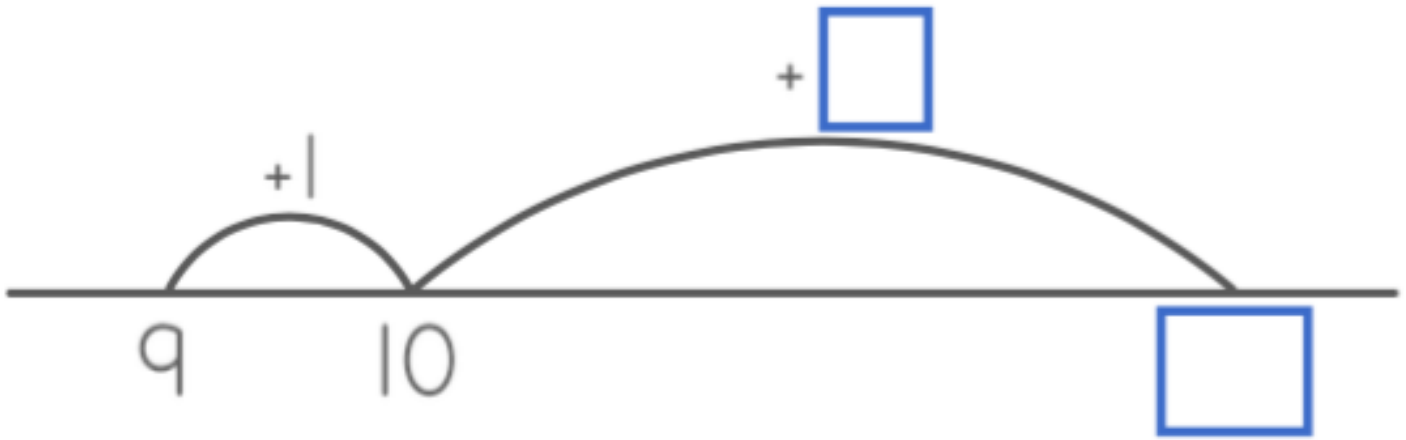


Finish the picture

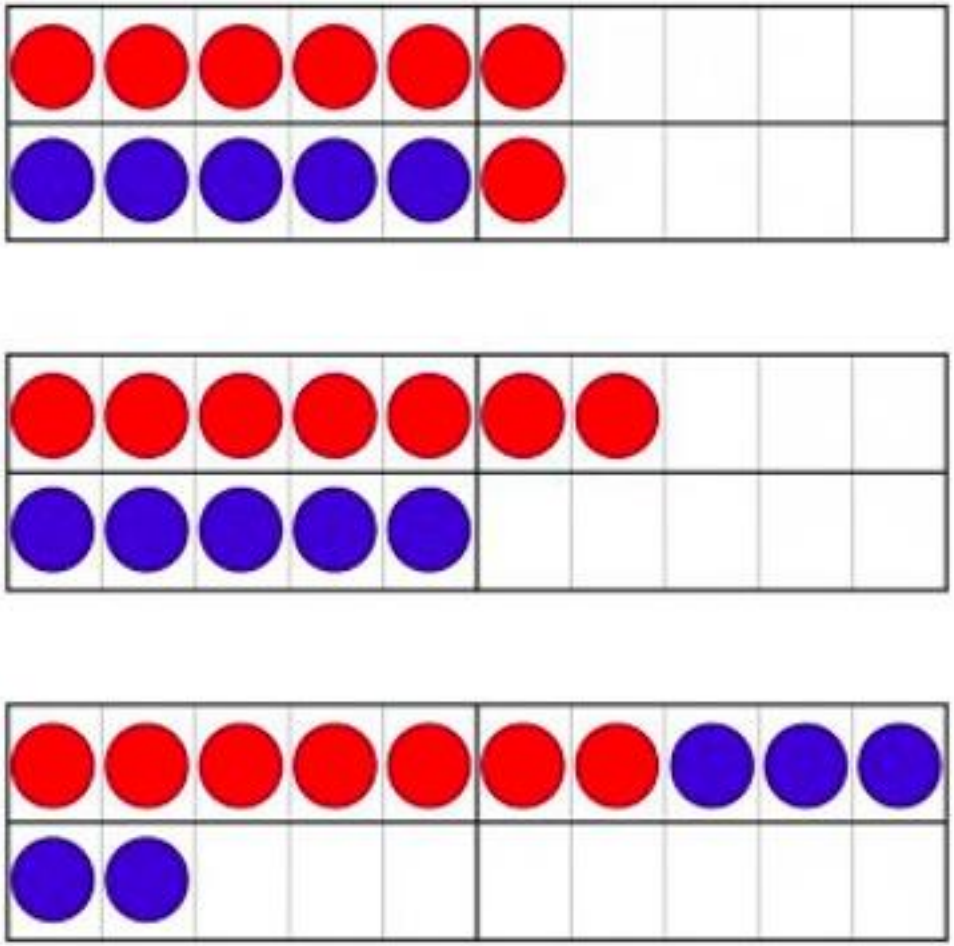
9 + 5 = ☐





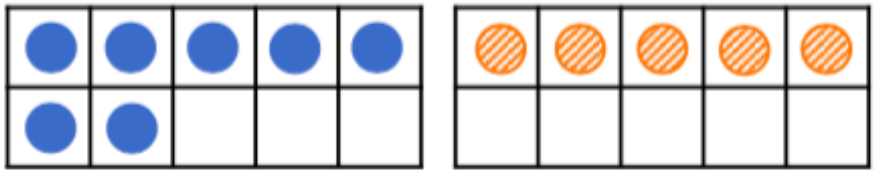


Try 7+5=



Different ways

7 + 5 = ☐



7 + 5 is the same as:

5 + 5 + ☐

7 + 3 + ☐

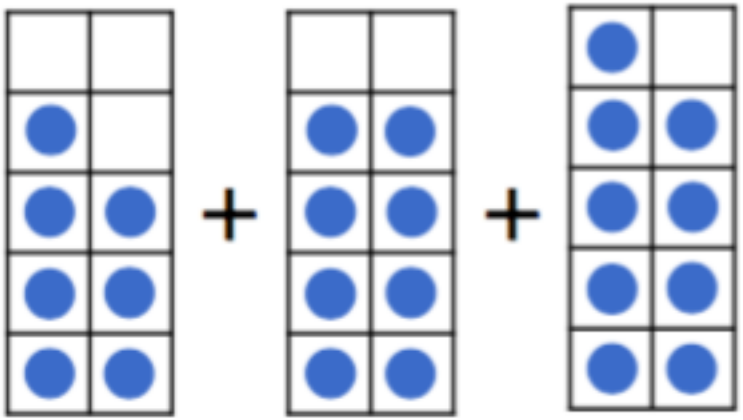
6 + ☐

Mathstopia

$$7 + 8 + 9 = \square$$

Different ways

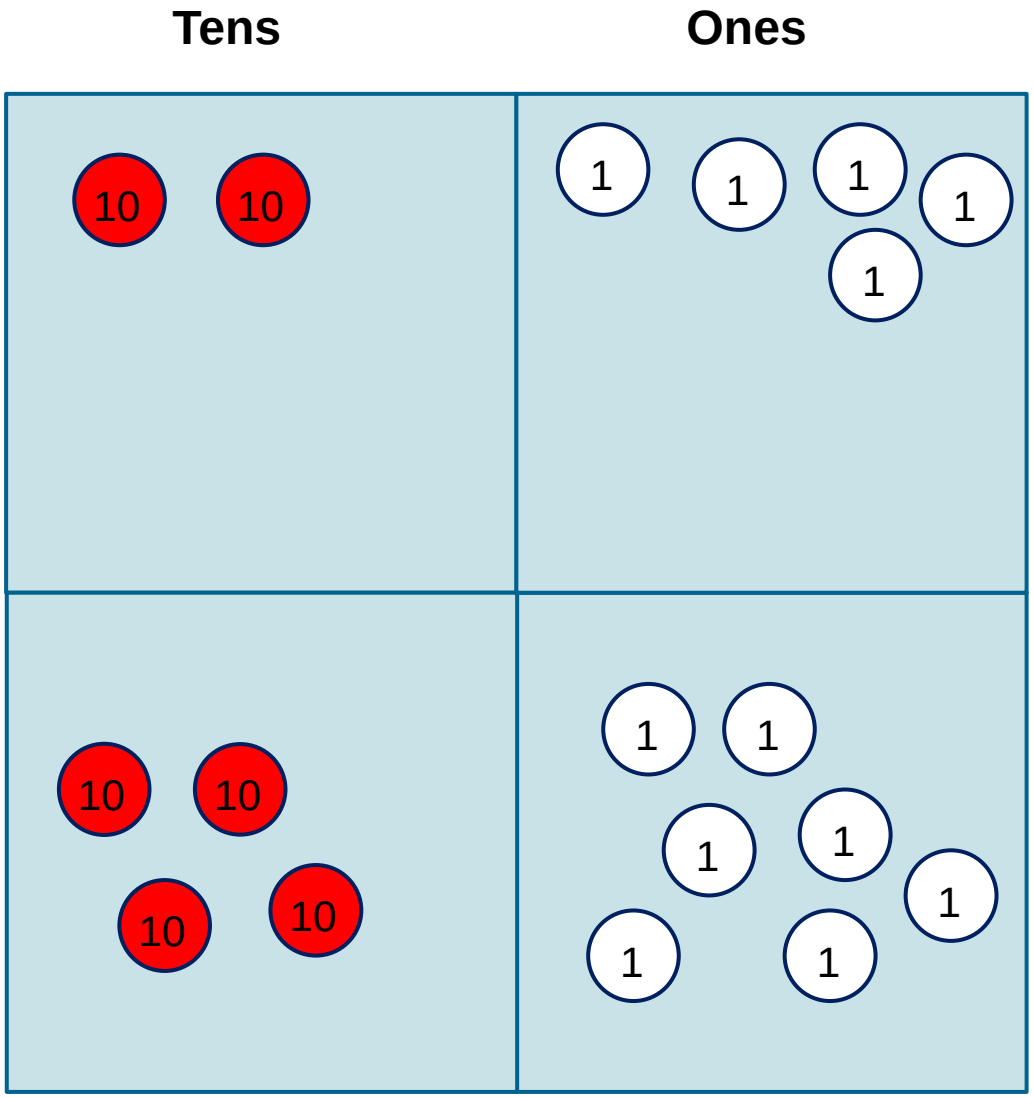
$$7 + 8 + 9 = \square$$



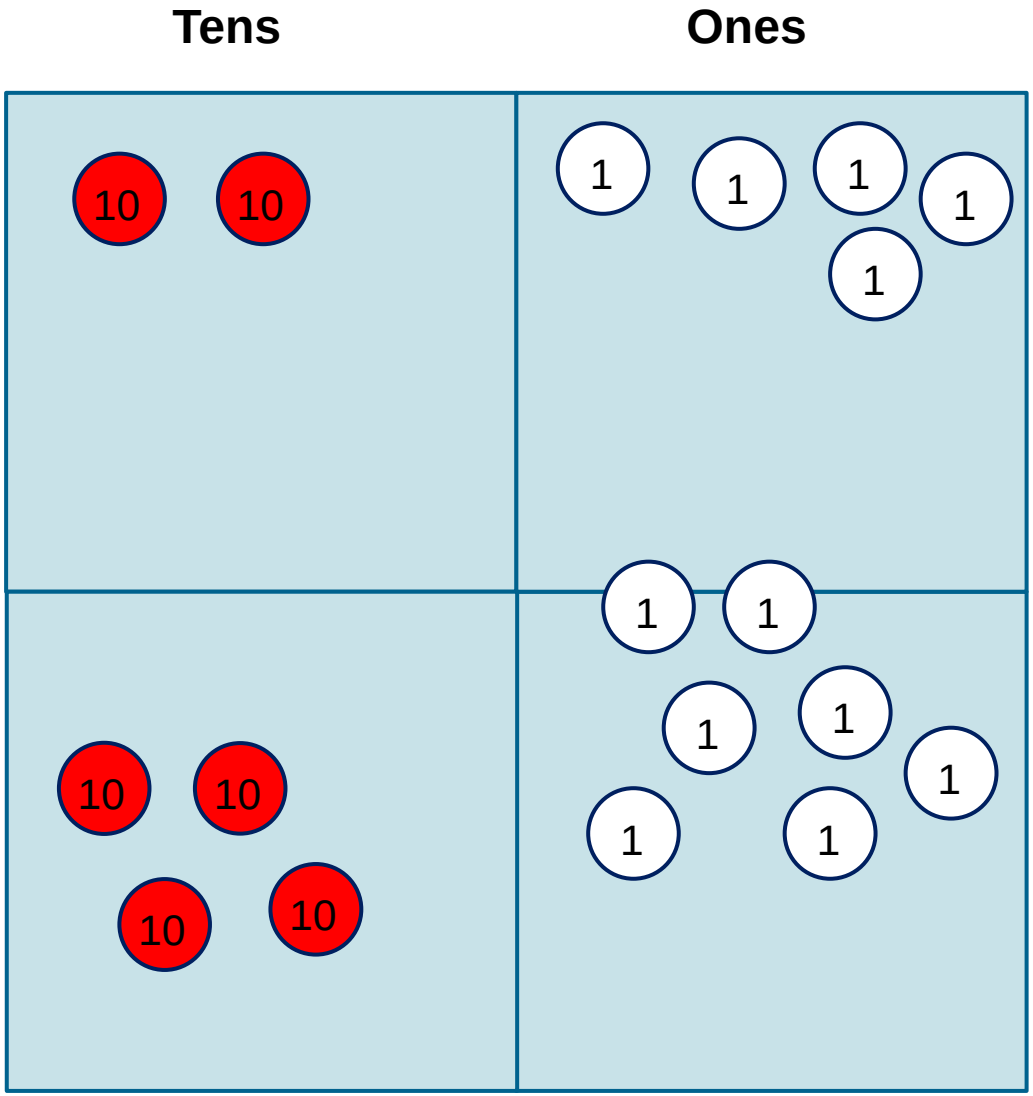
Add $\square$ + $\square$ then add $\square$

30 take away $\square$

3 lots of $\square$

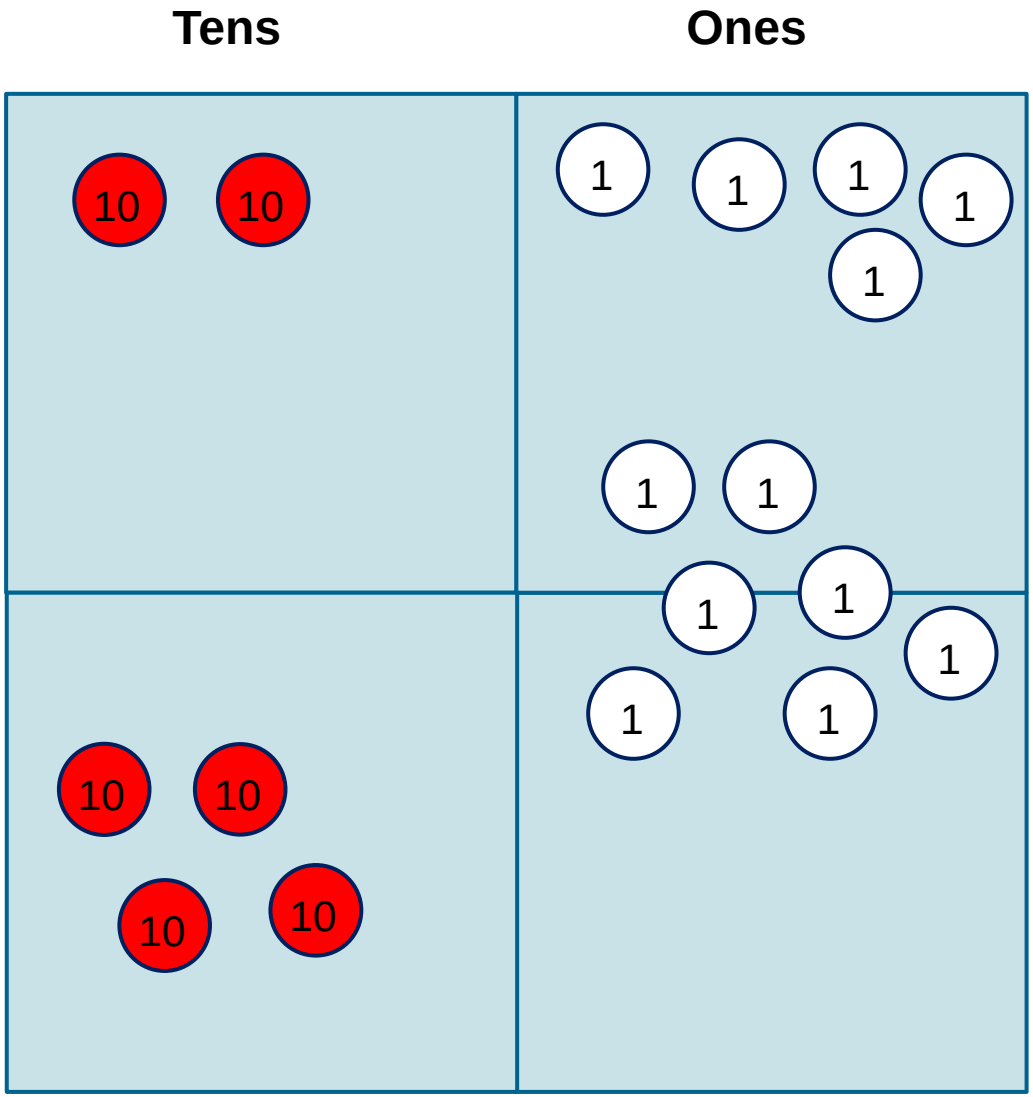


$$\begin{array}{r} 25 \\ +\,47 \\ \hline \\ \hline \end{array}$$



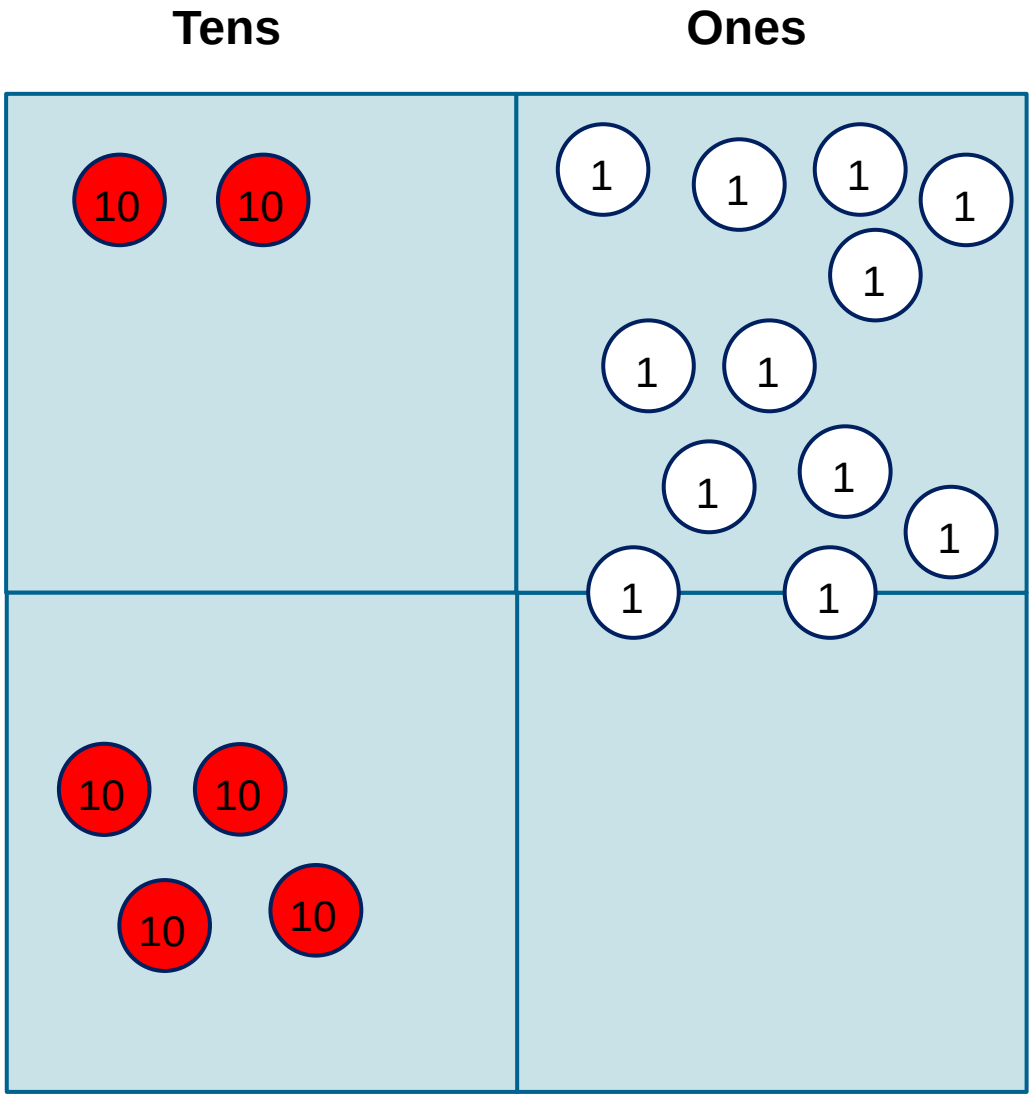
$$\begin{array}{r} 25 \\ +\,47 \\ \hline \\ \hline \end{array}$$

Mathstopia

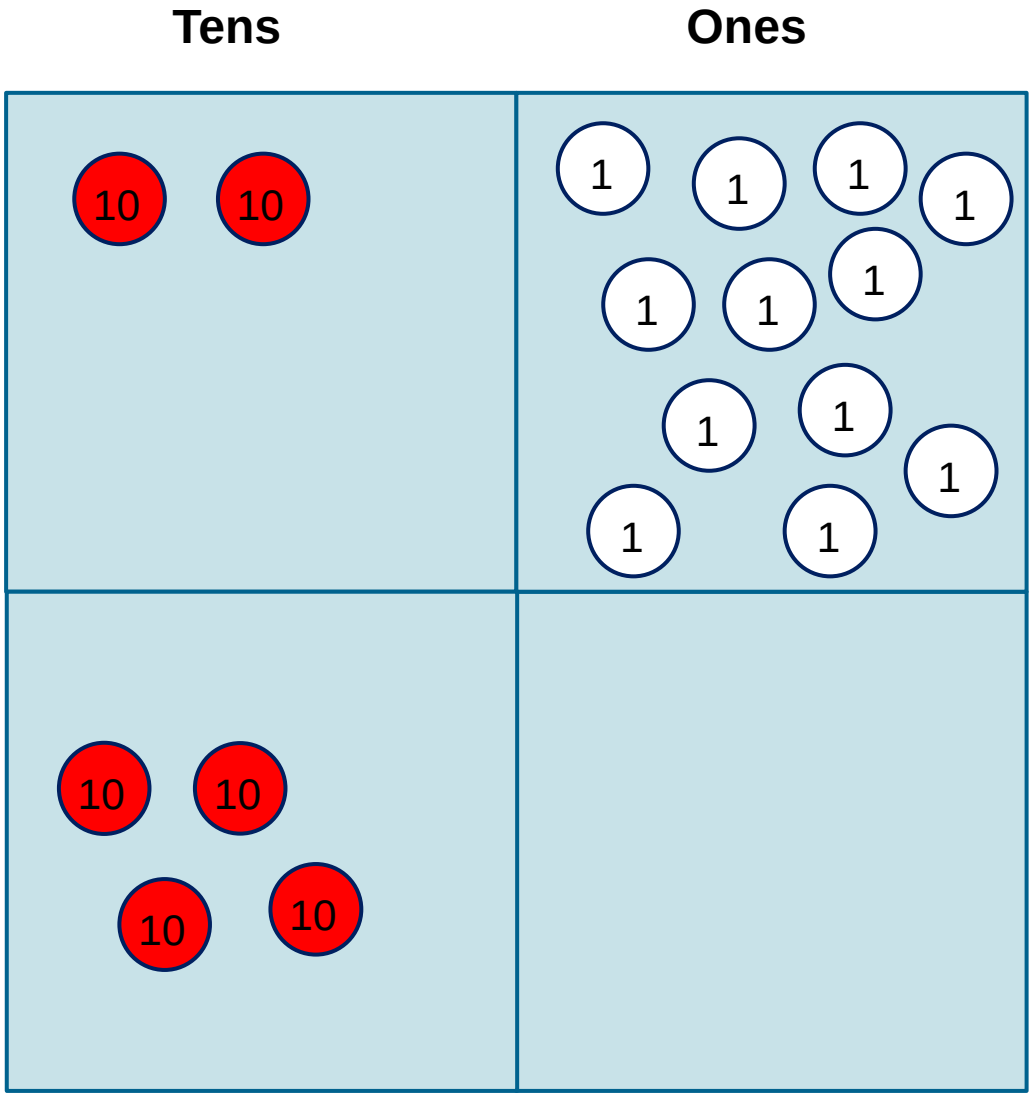


$$\begin{array}{r} 25 \\ +\,47 \\ \hline \\ \hline \end{array}$$

Mathstopia



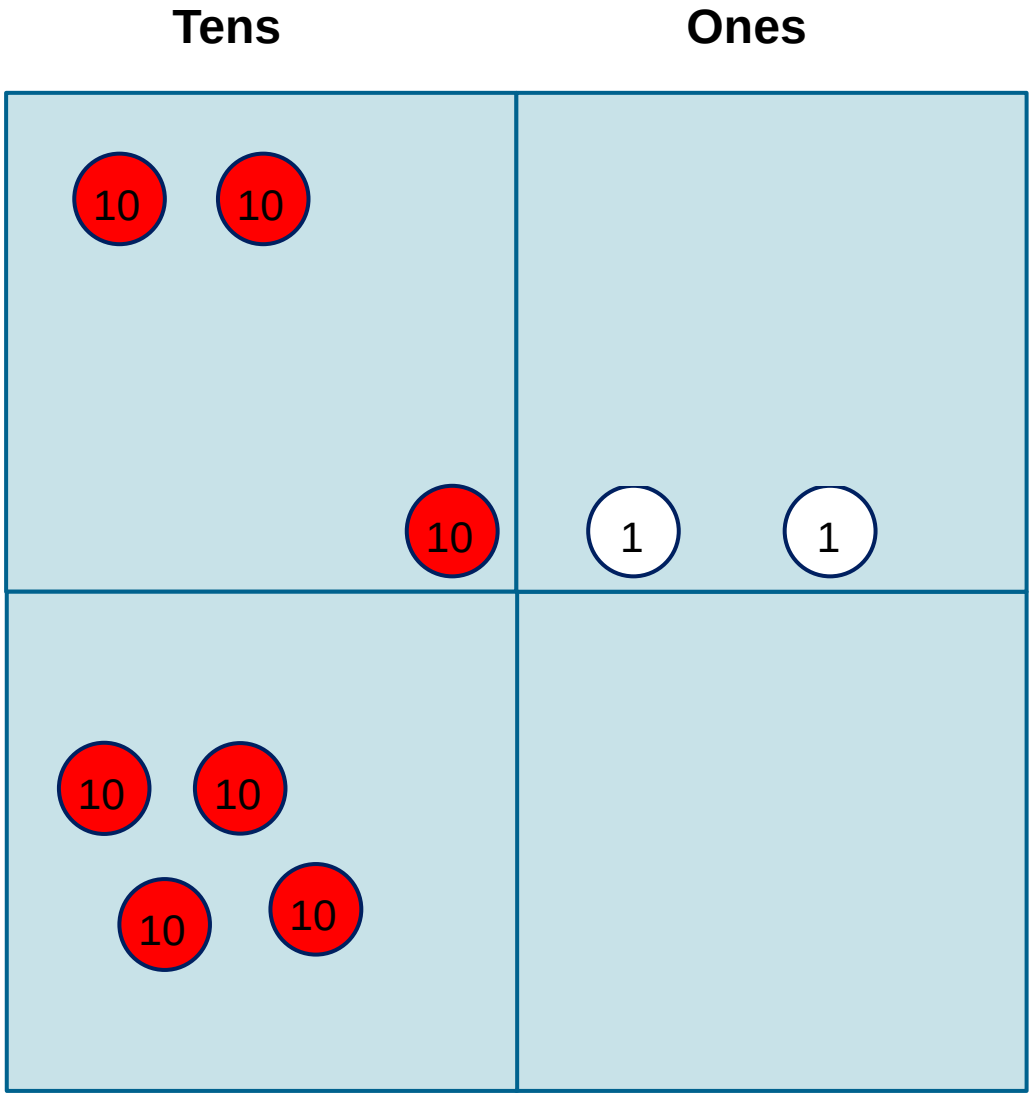
$$\begin{array}{r} 25 \\ +\,47 \\ \hline \\ \hline \end{array}$$



$$\begin{array}{r} 25 \\ +\,47 \\ \hline \\ \hline \end{array}$$

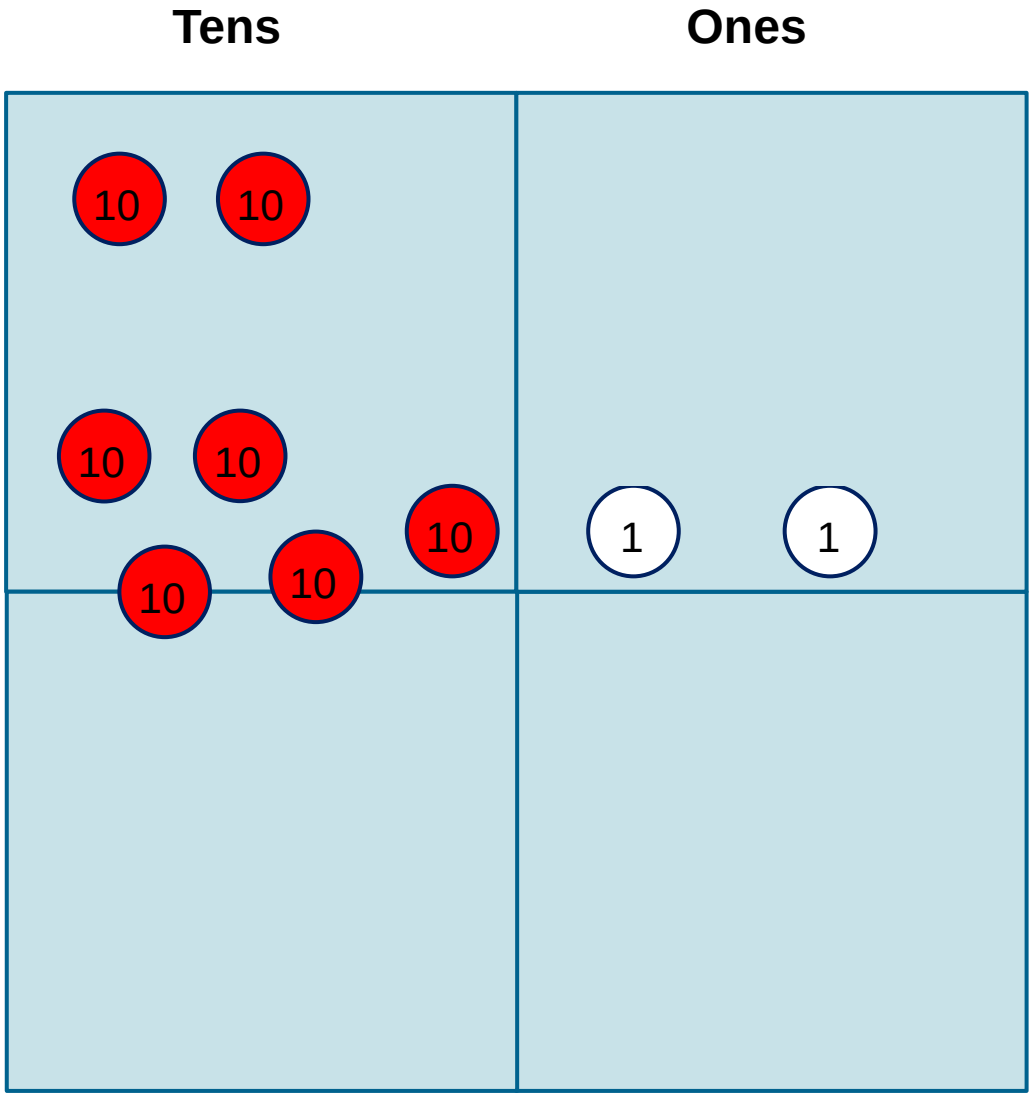
12

Mathstopia

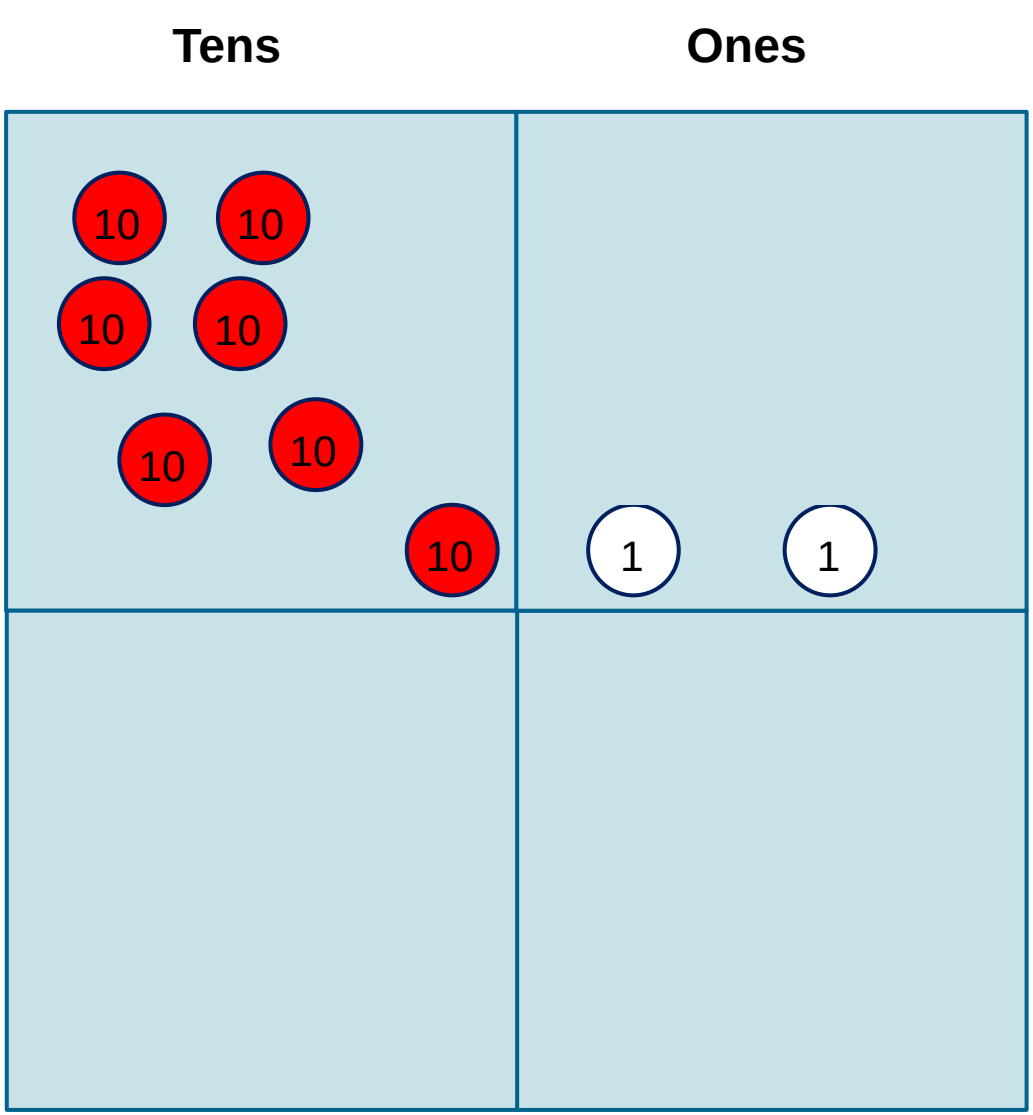


$$\begin{array}{r} 25 \\ +\,47 \\ \hline 2 \\ \hline \end{array}$$

1



$$\begin{array}{r} 25 \\ +\,47 \\ \hline 2 \\ \hline 1 \end{array}$$

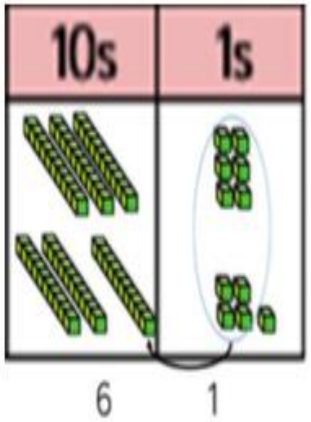
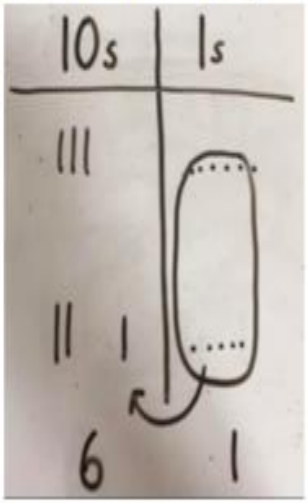
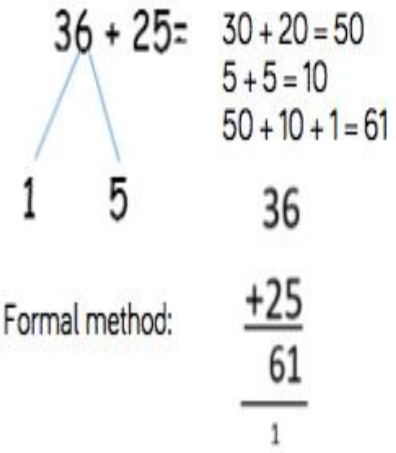


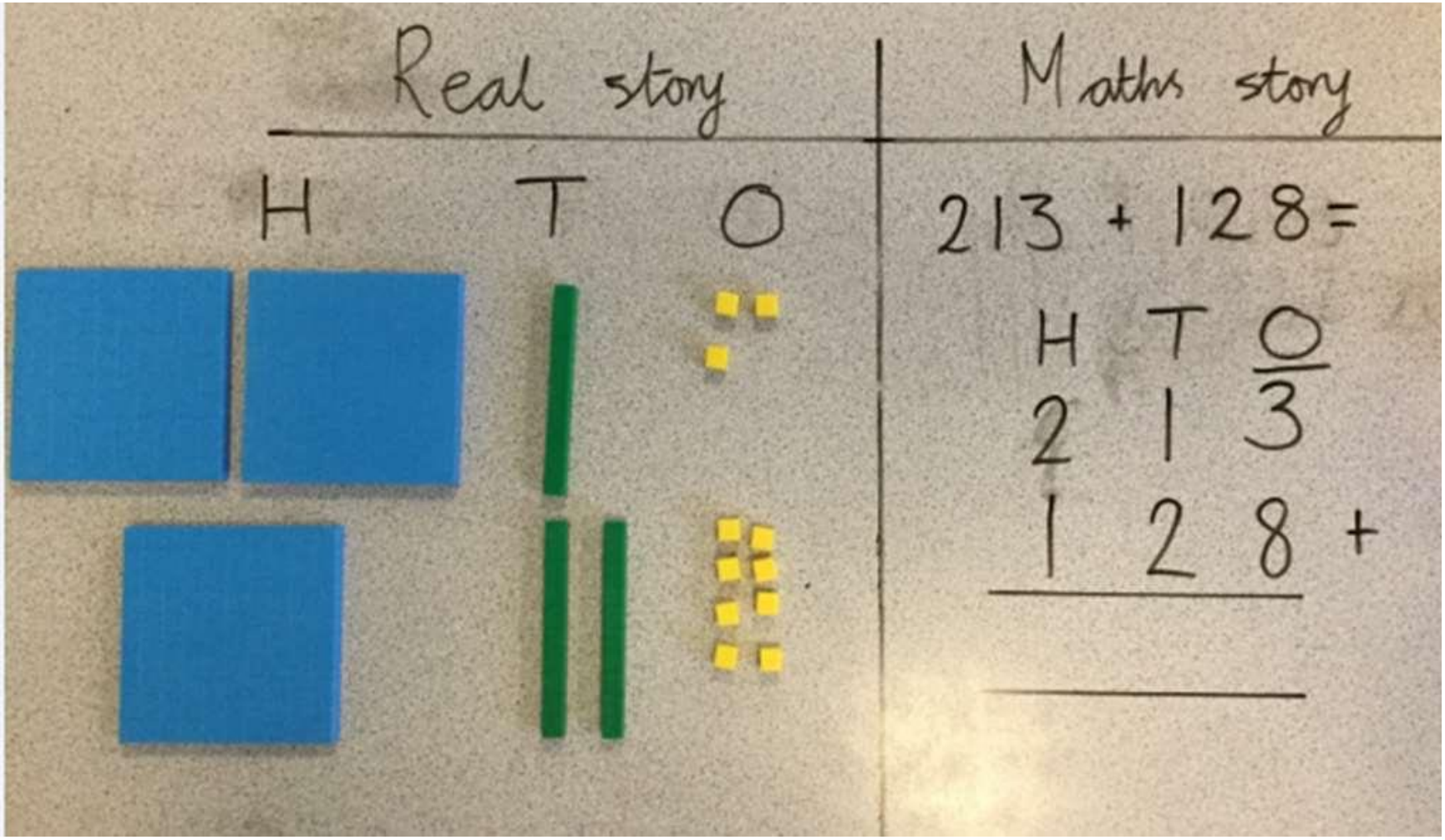
Check

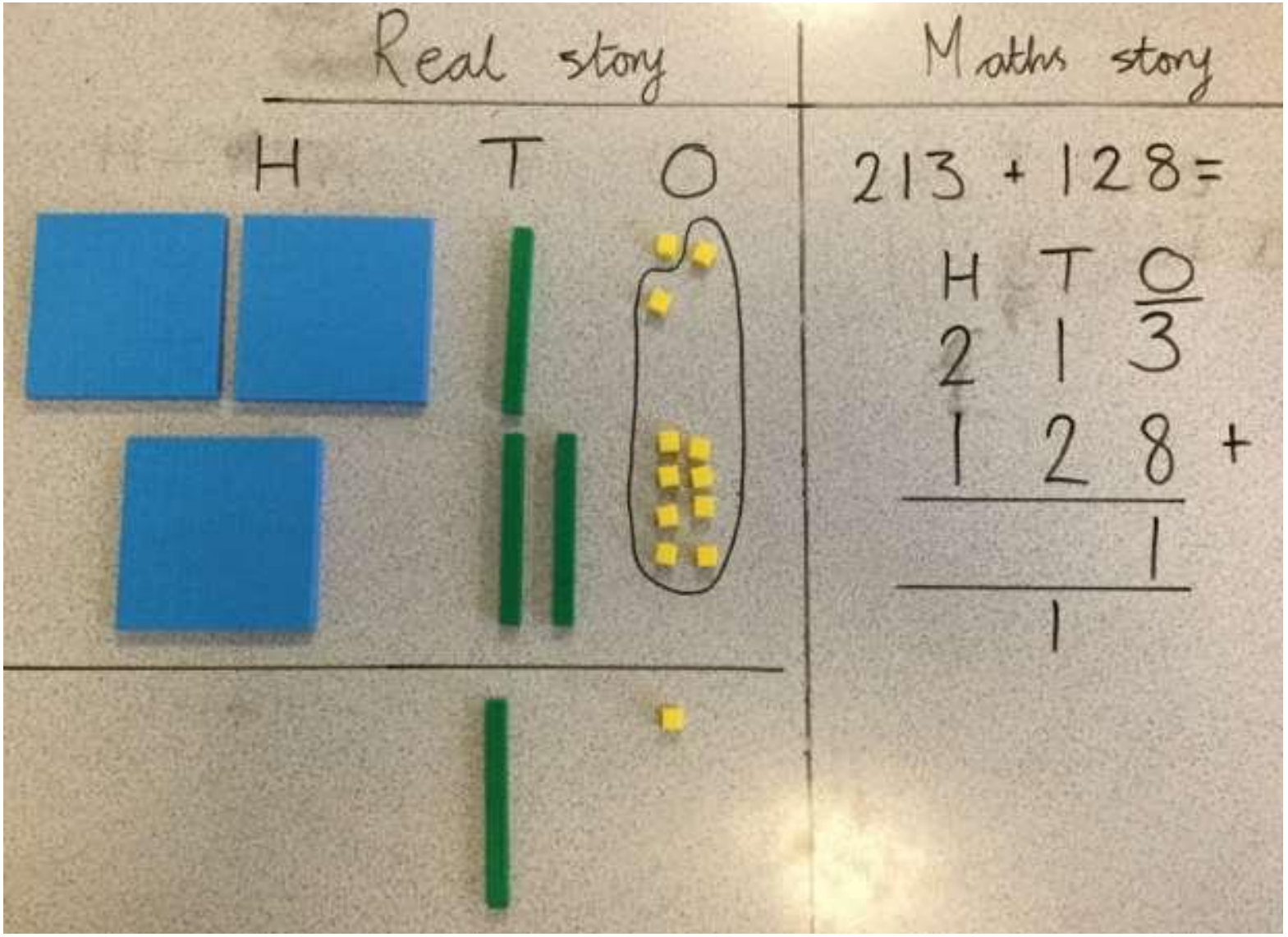
$$\begin{array}{r} 25 \\ +\,47 \\ \hline 72 \\ \hline \end{array}$$

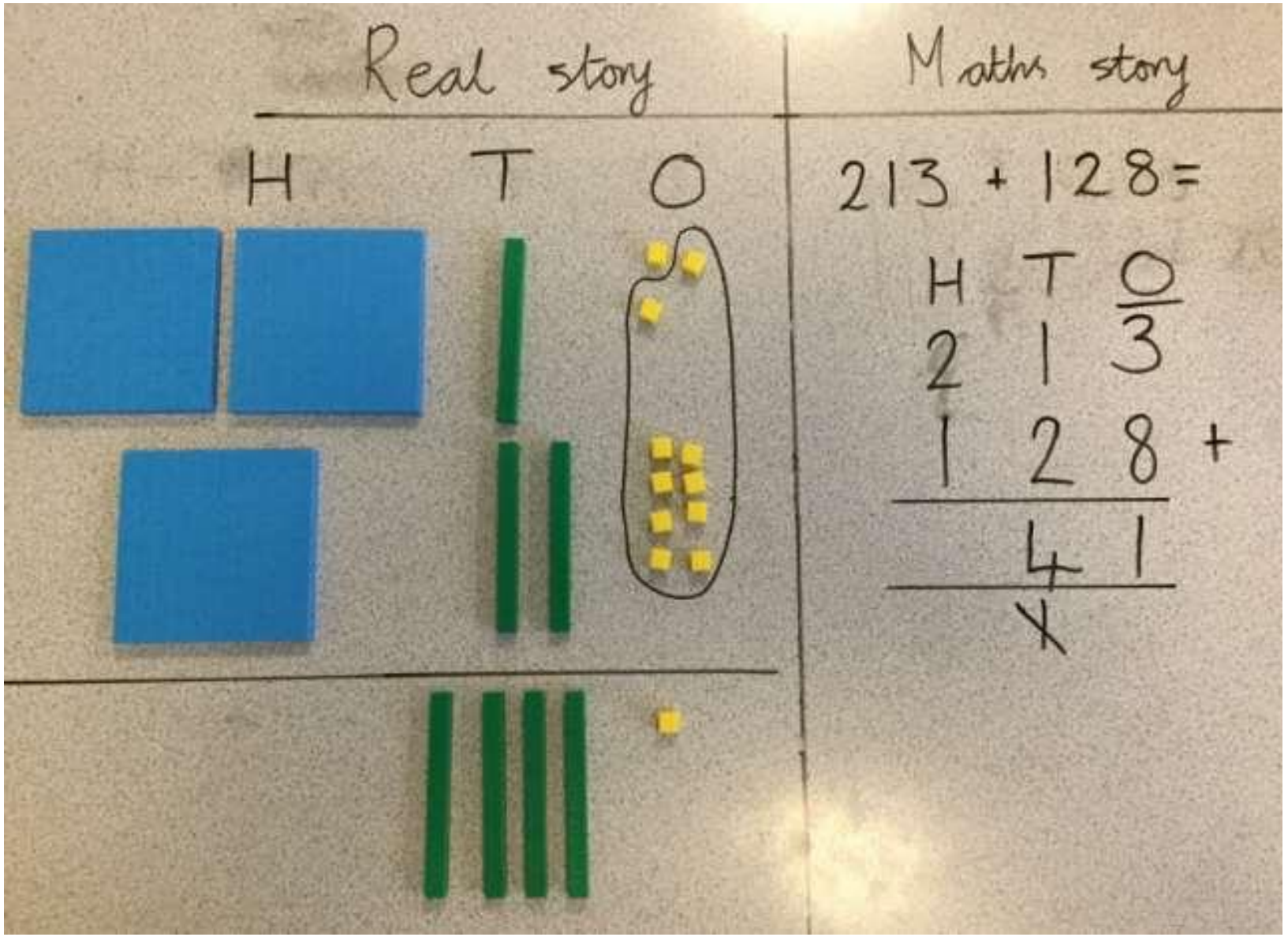
1

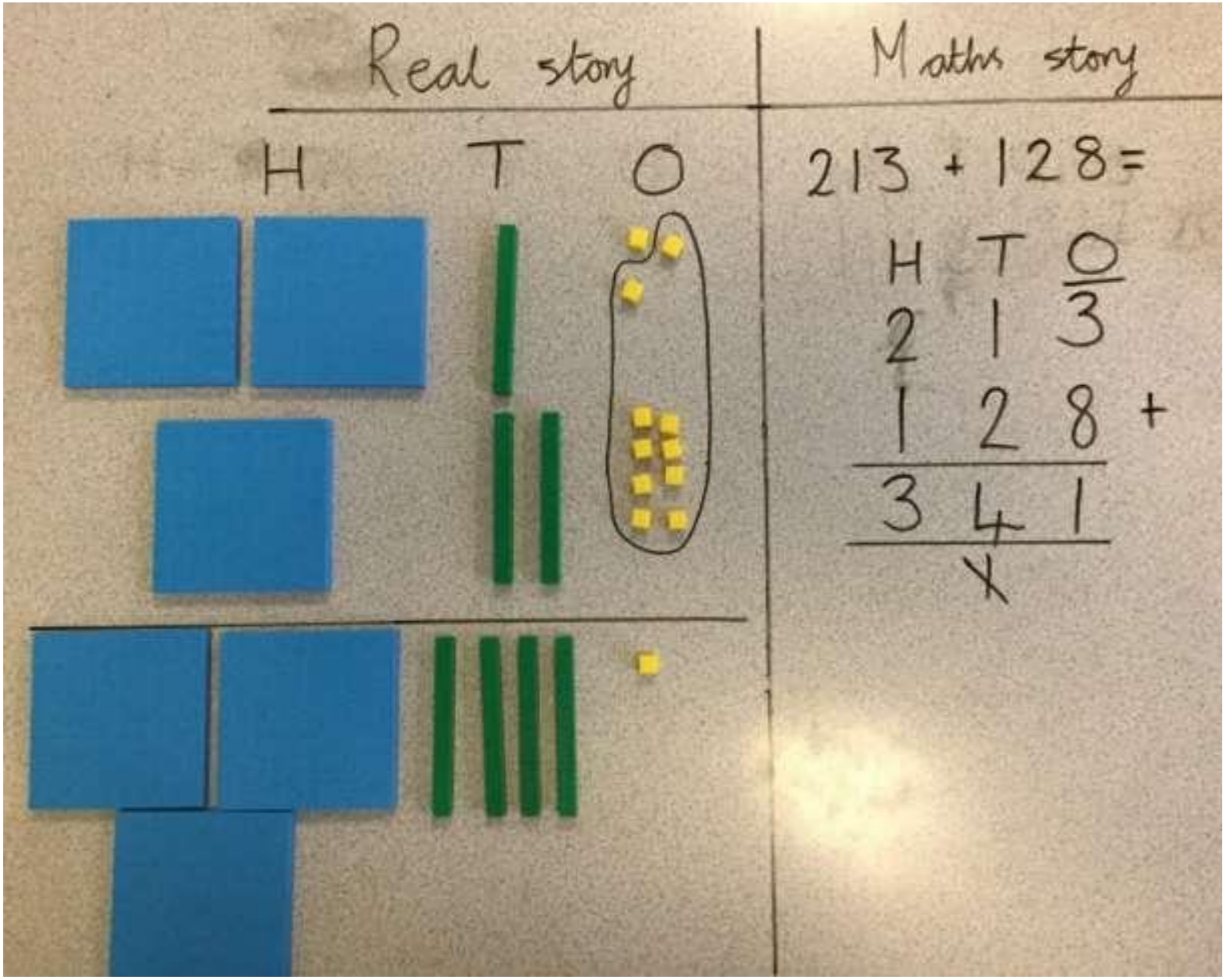
Mathstopia

TO + TO using base 10. Continue to develop understanding of partitioning and place value. 36 + 25  	Chidlren to represent the base 10 in a place value chart.  	Looking for ways to make 10. 

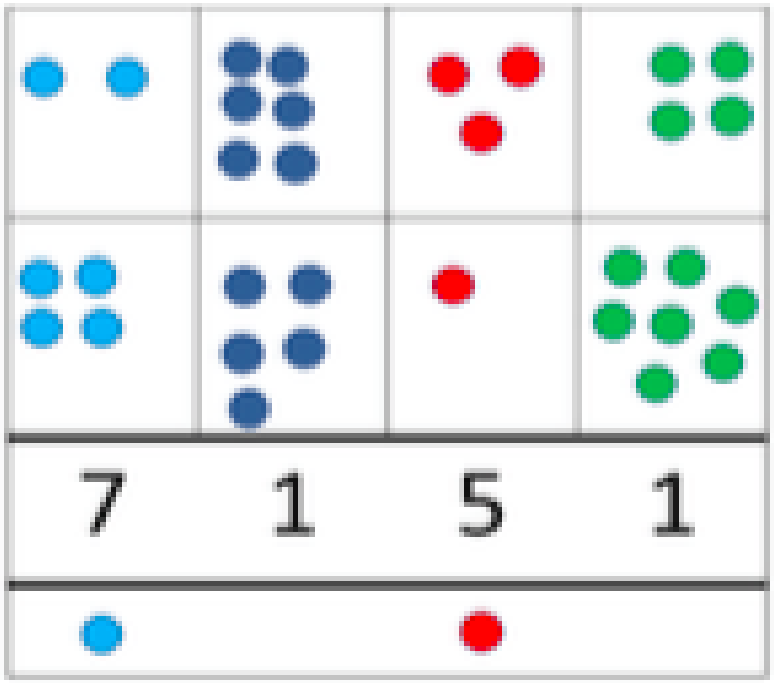








Year 4 Addition

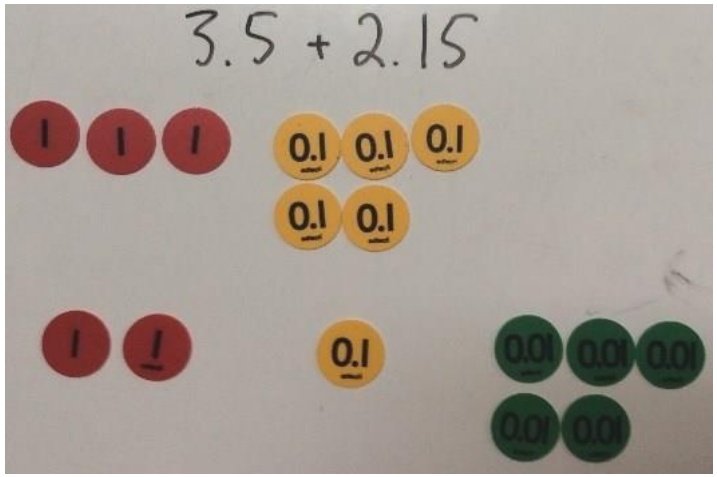


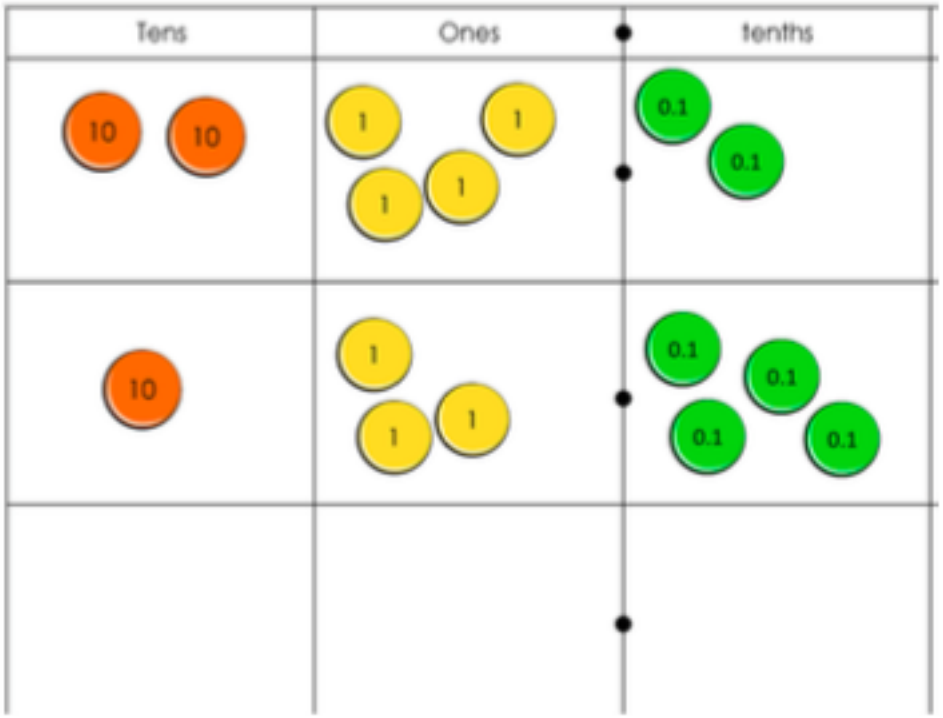
$$\begin{array}{r} 2634 \\ +4517 \\ \hline 7151 \\ \hline {\scriptstyle 1}\quad\ {\scriptstyle 1} \end{array}$$

Mathstopia

Place value counters to support adding decimals

24.2 + 13.4 =

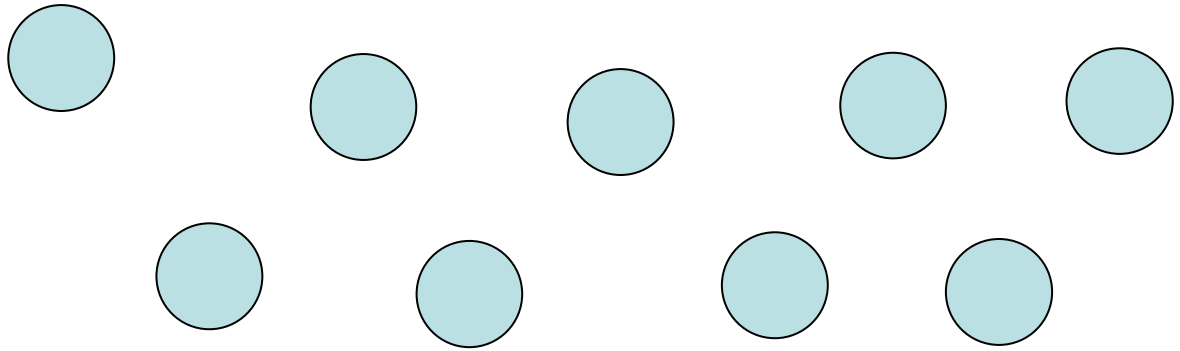




Mathstopia

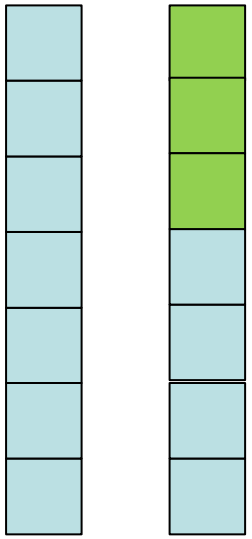
Taking Away

Using practical equipment to count out the first number and removing or taking away the second number to find the solution, e.g. 9 - 4



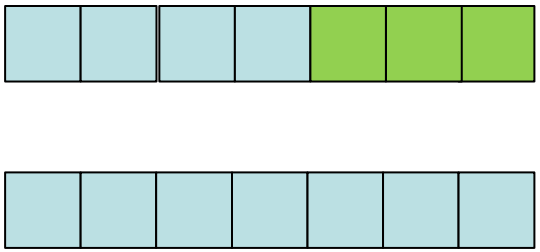
Finding the Difference or Comparison (Counting On)

Children need to understand how counting on links to subtraction, e.g. 7 – 4
Make the small tower the same size as the large tower.



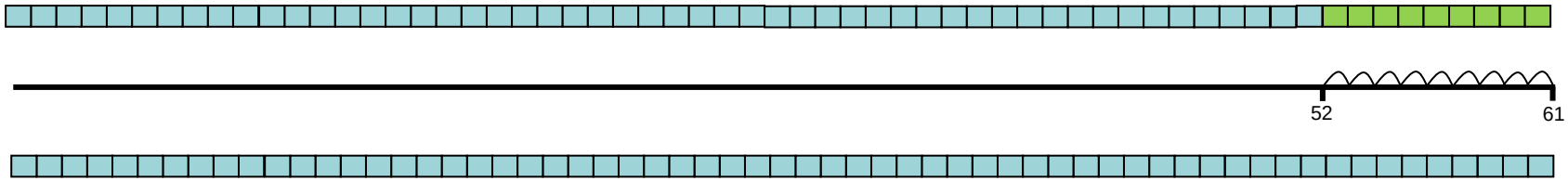
Finding the Difference (Counting On)

To begin linking to number lines, this can be looked at horizontally instead of vertically.



Again, an important mental model - number lines

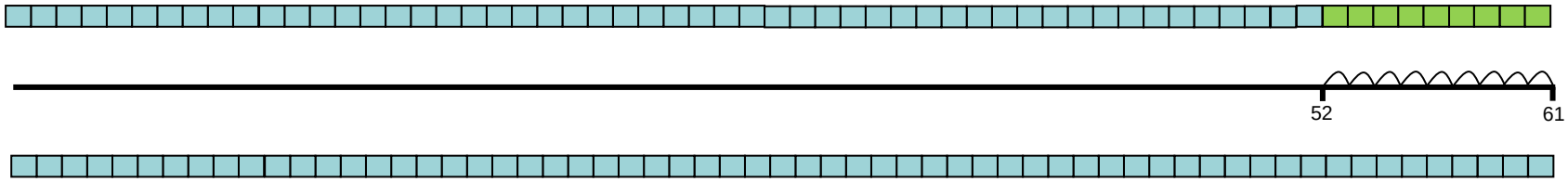
61 - 52



Mathstopia

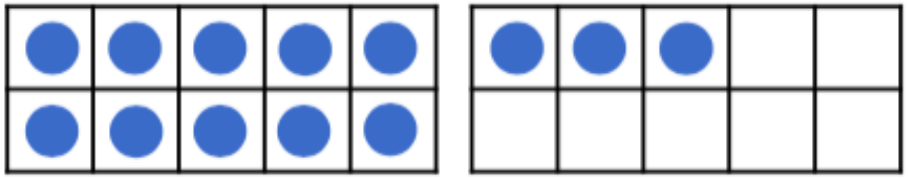
Moving on to Number lines

61 - 52



Mathstopia

Which way?



13 - 9 = □

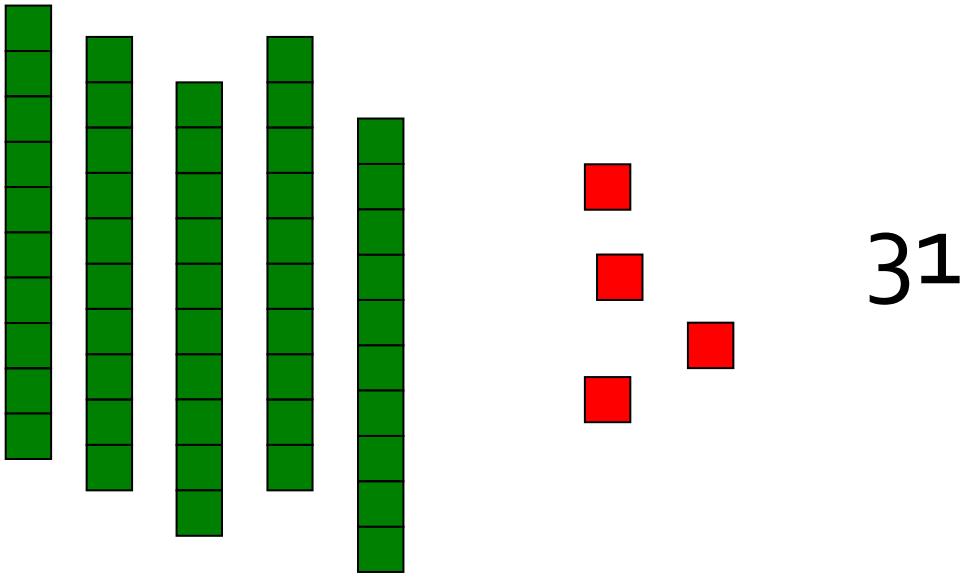
Take all 9 from the full 10-frame

Take some from both 10-frames

Mathstopia

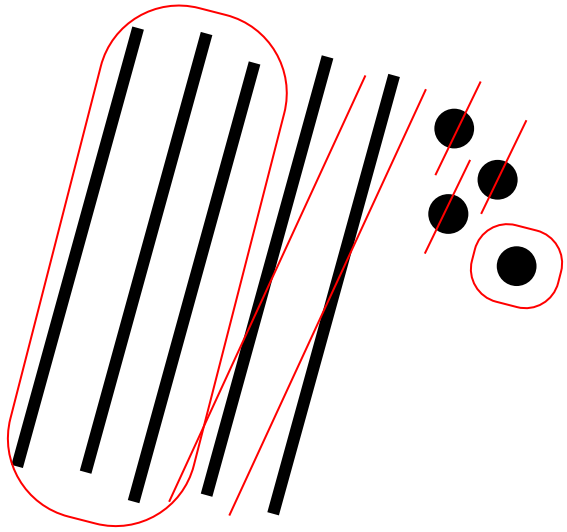
Taking Away Two Digit Numbers

Children can use base 10 equipment to support their subtraction strategies by basing them on counting, e.g. 54 - 23

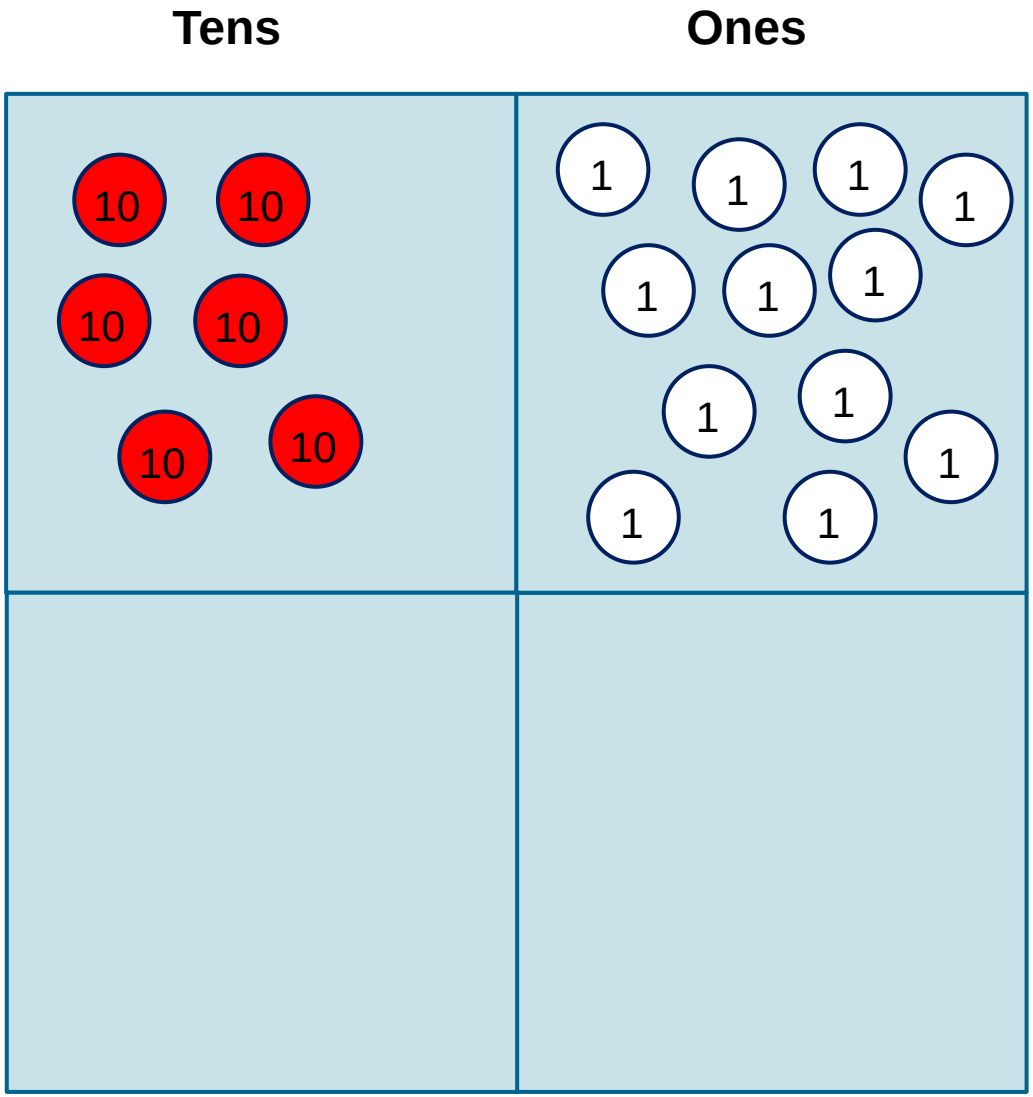


Taking Away Two Digit Numbers

Children can support their own calculations by using jottings, e.g. 54 - 23

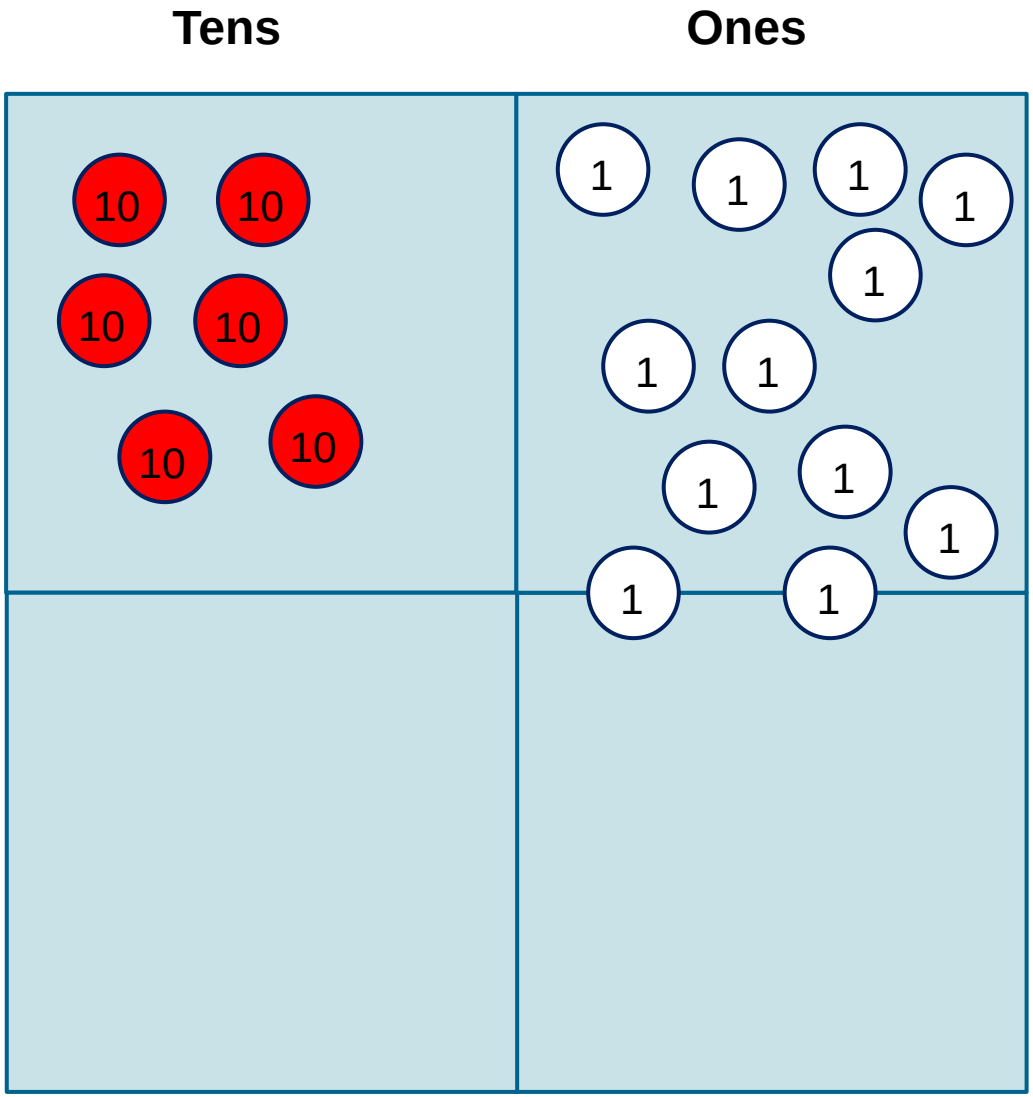


31



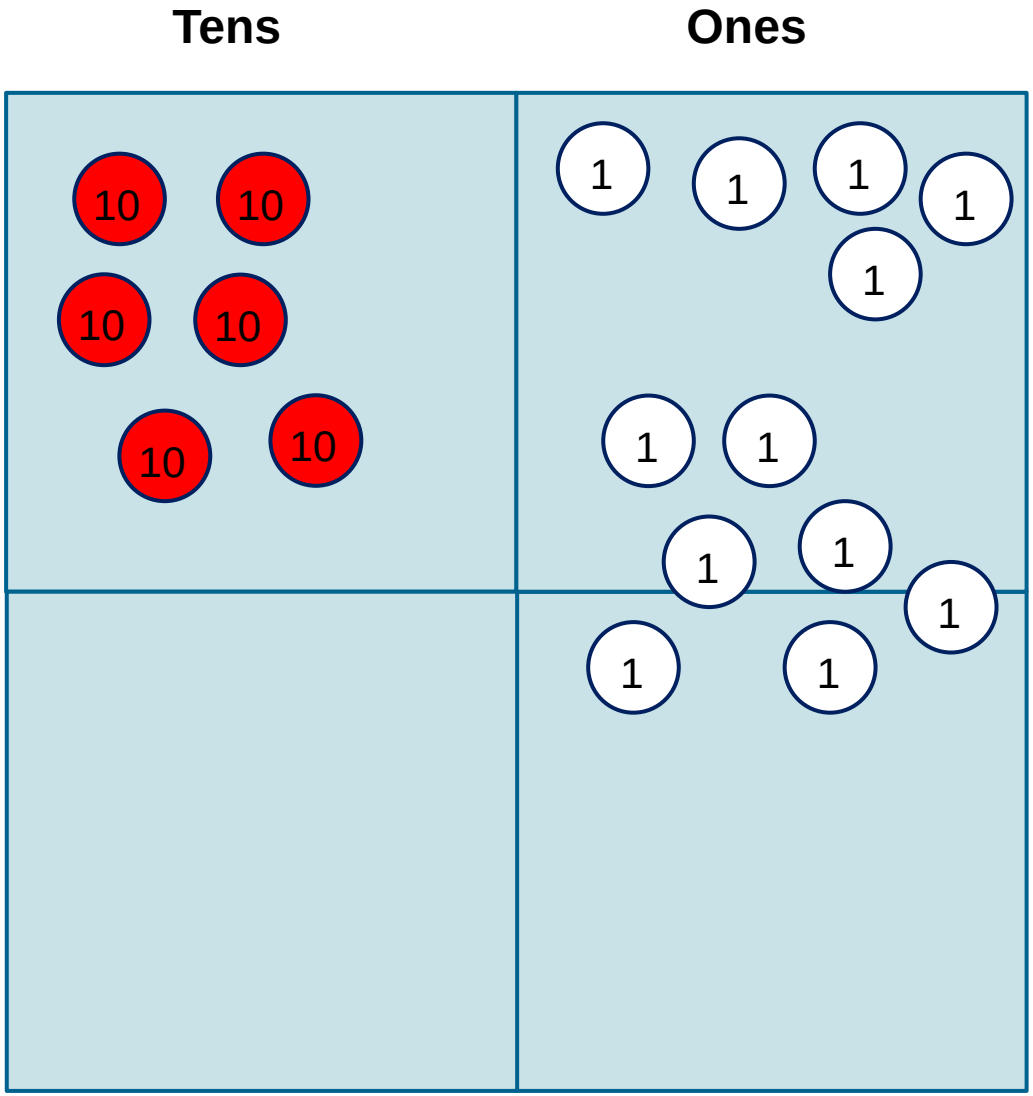
$$\begin{array}{r} {}^{6}\cancel{7}\,{}^{1}2 \\ -\ 4\ 7 \\ \hline \\ \hline \end{array}$$

Mathstopia



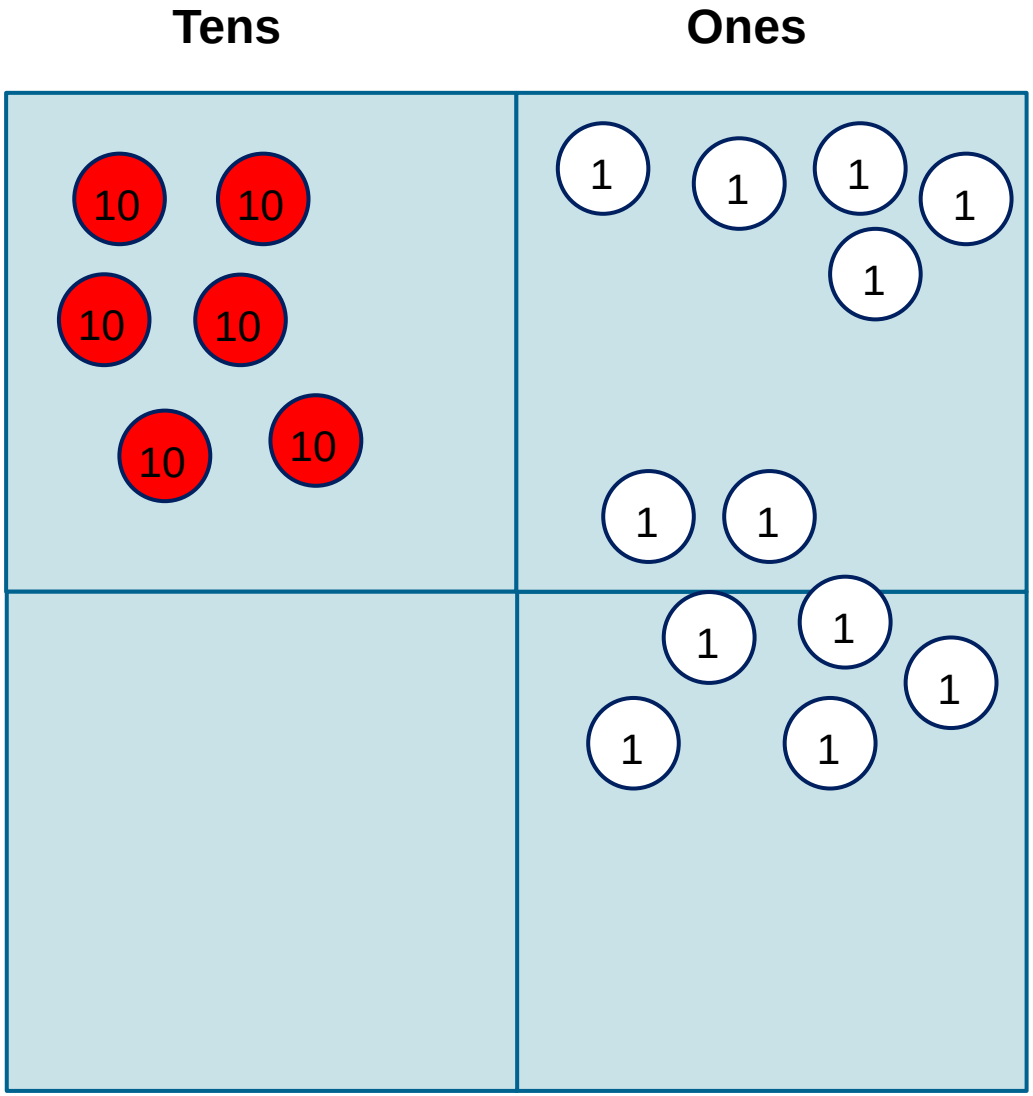
$$\begin{array}{r} {\scriptstyle 6}\cancel{7}^{\,1}2 \\ -\ 4\ 7 \\ \hline \\ \hline \end{array}$$

Mathstopia



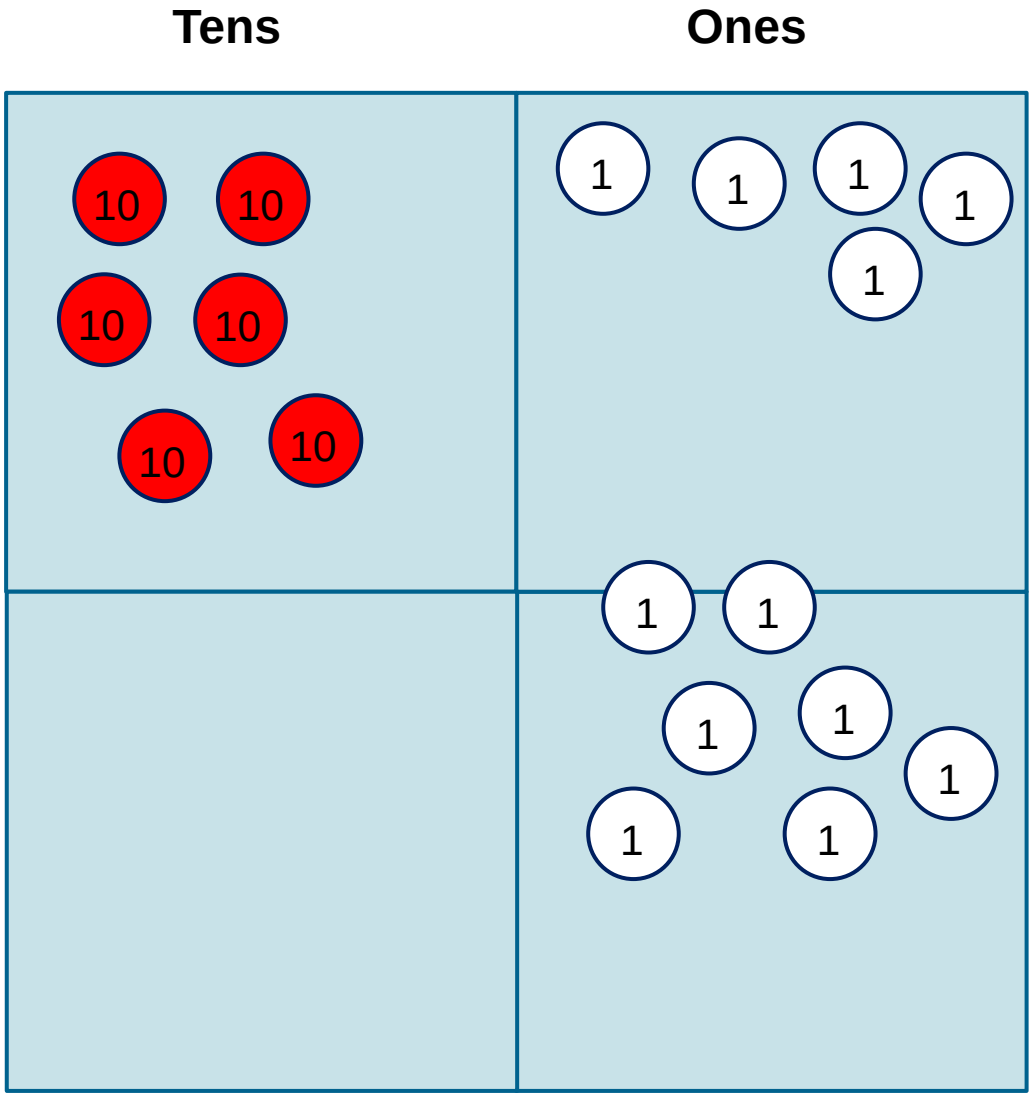
$$\begin{array}{r} {}^{6}\cancel{7}\,{}^{1}2 \\ -\ 4\ 7 \\ \hline \\ \hline \end{array}$$

Mathstopia



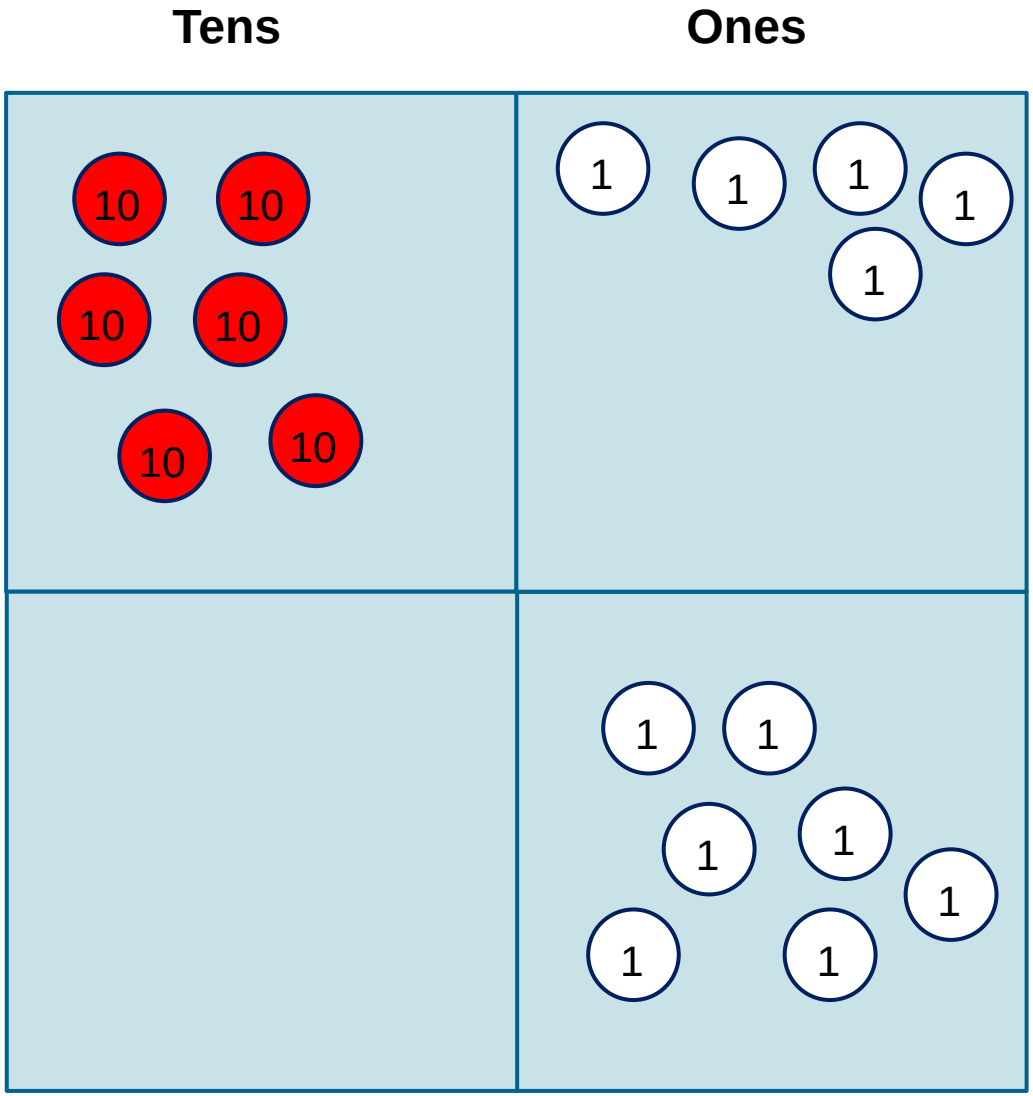
$$\begin{array}{r} {\scriptstyle 6}\cancel{7}^{\,1}2 \\ -\ 4\ 7 \\ \hline \\ \hline \end{array}$$

Mathstopia



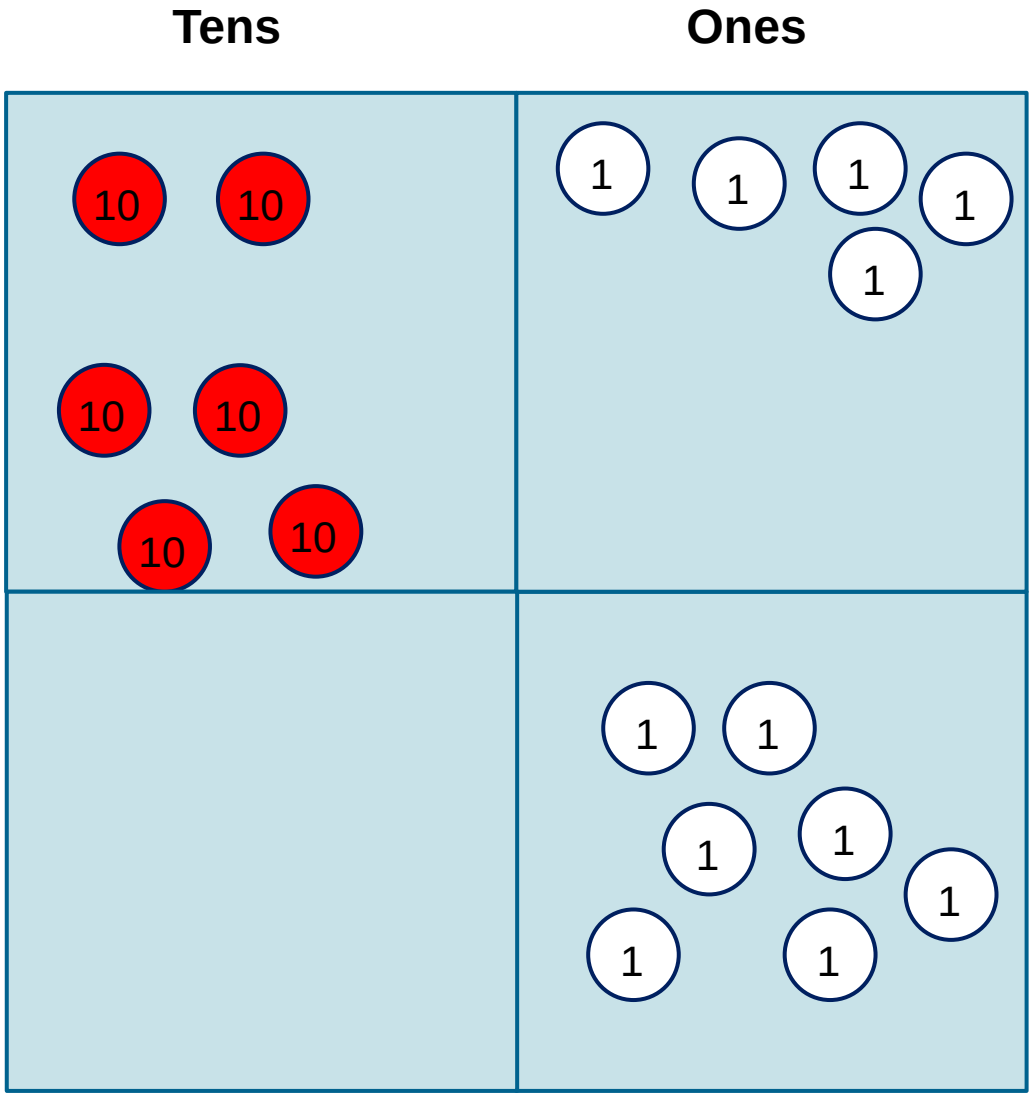
$$\begin{array}{r} {\scriptstyle 6}\not{7}\,{\scriptstyle 1}2 \\ -\ 4\ 7 \\ \hline \\ \hline \end{array}$$

Mathstopia



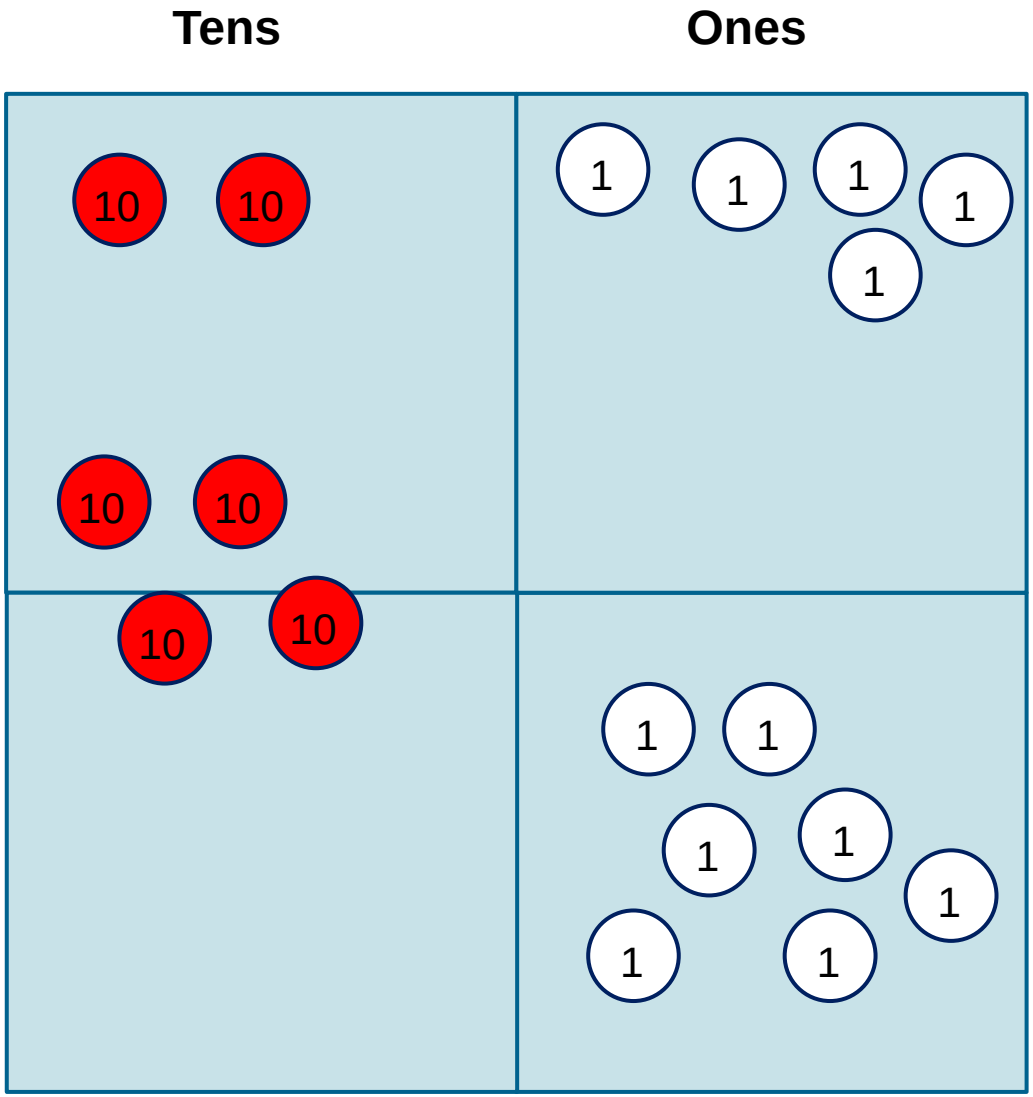
$$\begin{array}{r} {}^{6}\cancel{7}\,{}^{1}2 \\ -\ 4\ 7 \\ \hline 5 \end{array}$$

Mathstopia



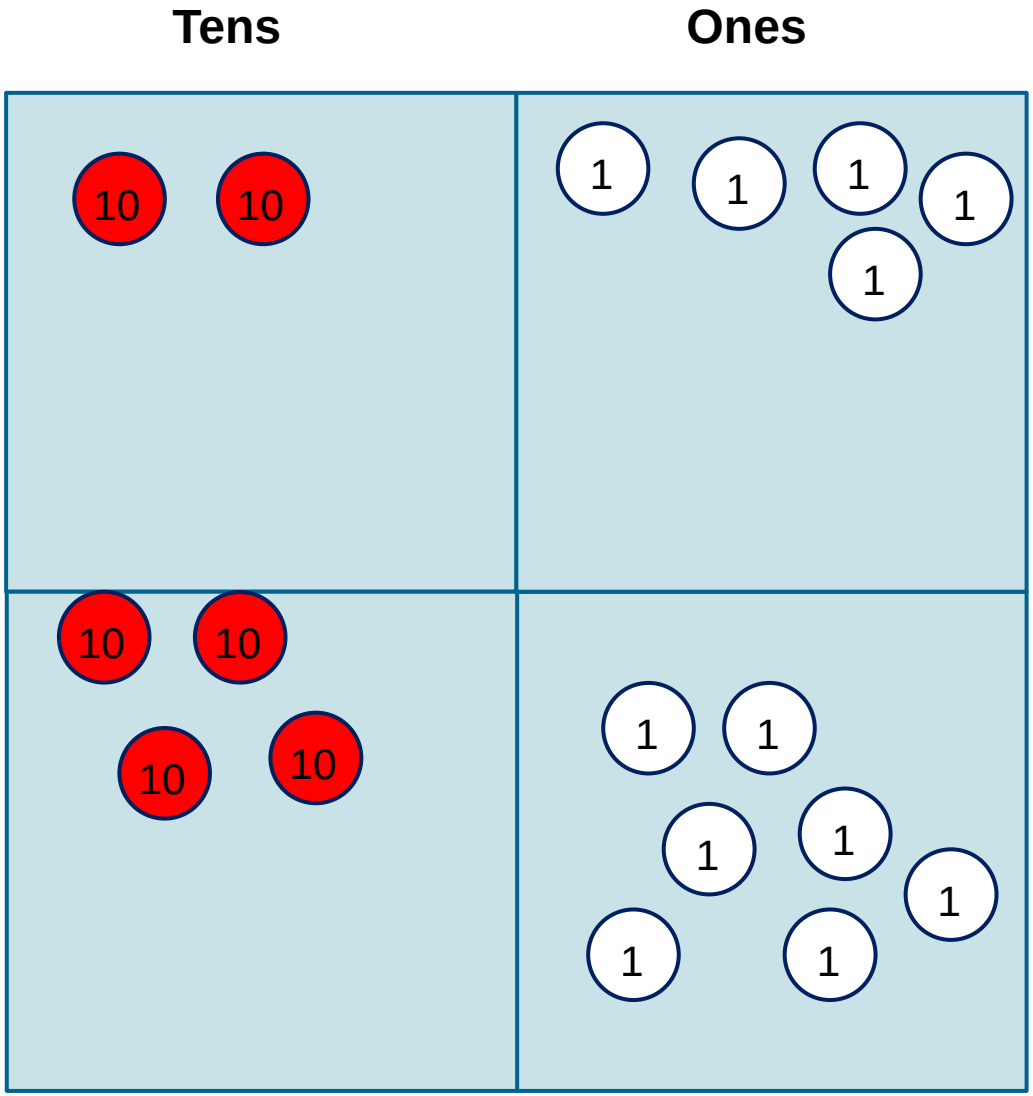
$$\begin{array}{r} {\scriptstyle 6}\not{7}\,{\scriptstyle 1}2 \\ -\ 4\ 7 \\ \hline 5 \end{array}$$

Mathstopia



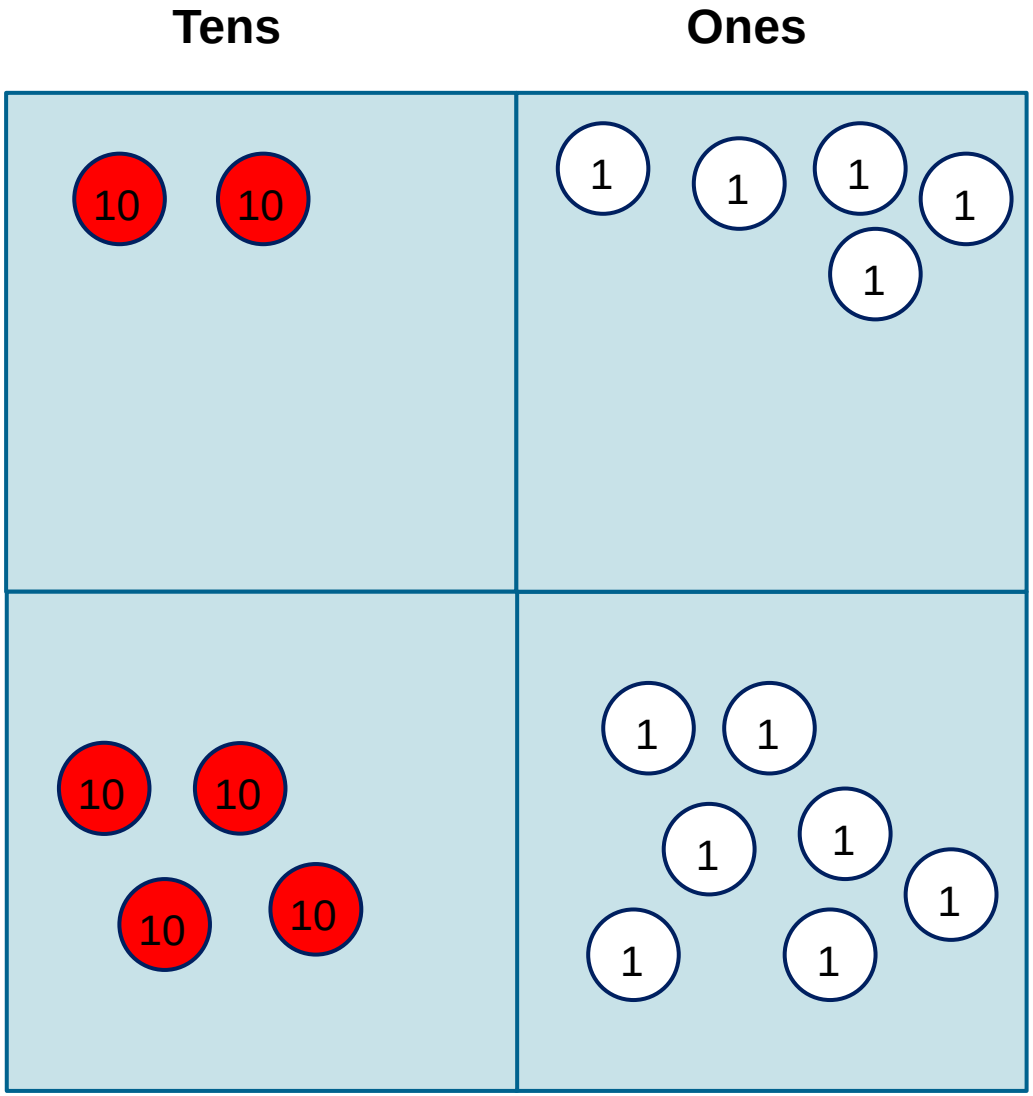
$$\begin{array}{r} {\scriptstyle 6}\not{7}\,{\scriptstyle 1}2 \\ -\ 4\ 7 \\ \hline 5 \end{array}$$

Mathstopia



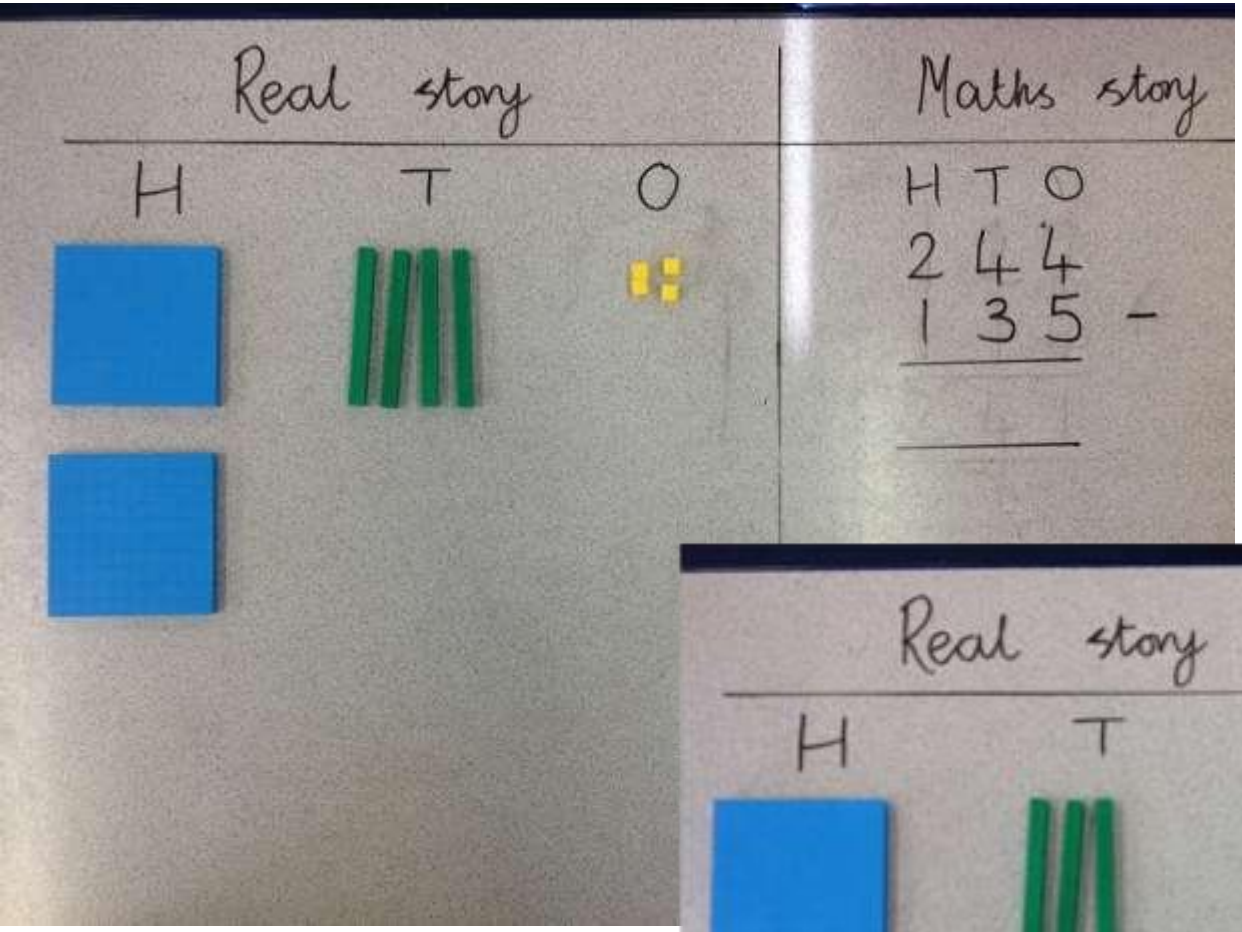
$$\begin{array}{r} {\scriptstyle 6}\not{7}\,{\scriptstyle 1}2 \\ -\ 4\ 7 \\ \hline 5 \end{array}$$

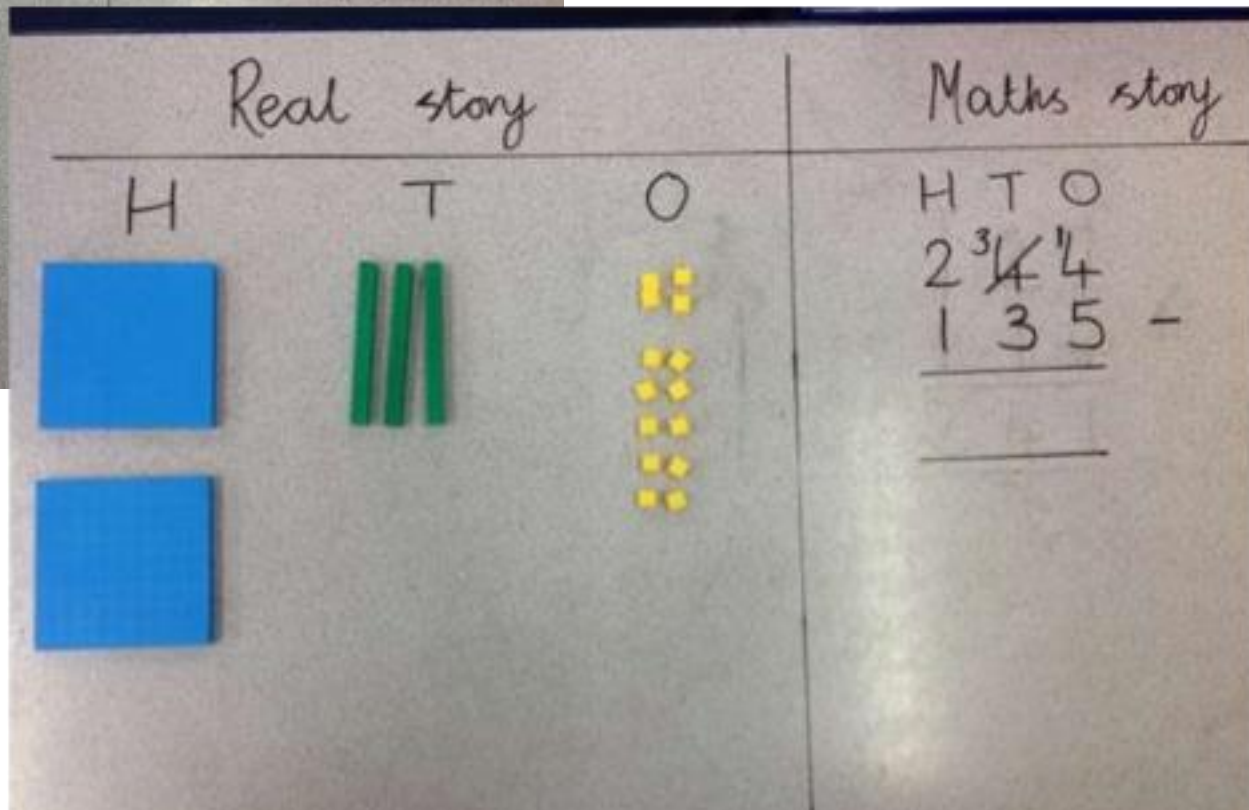
Mathstopia

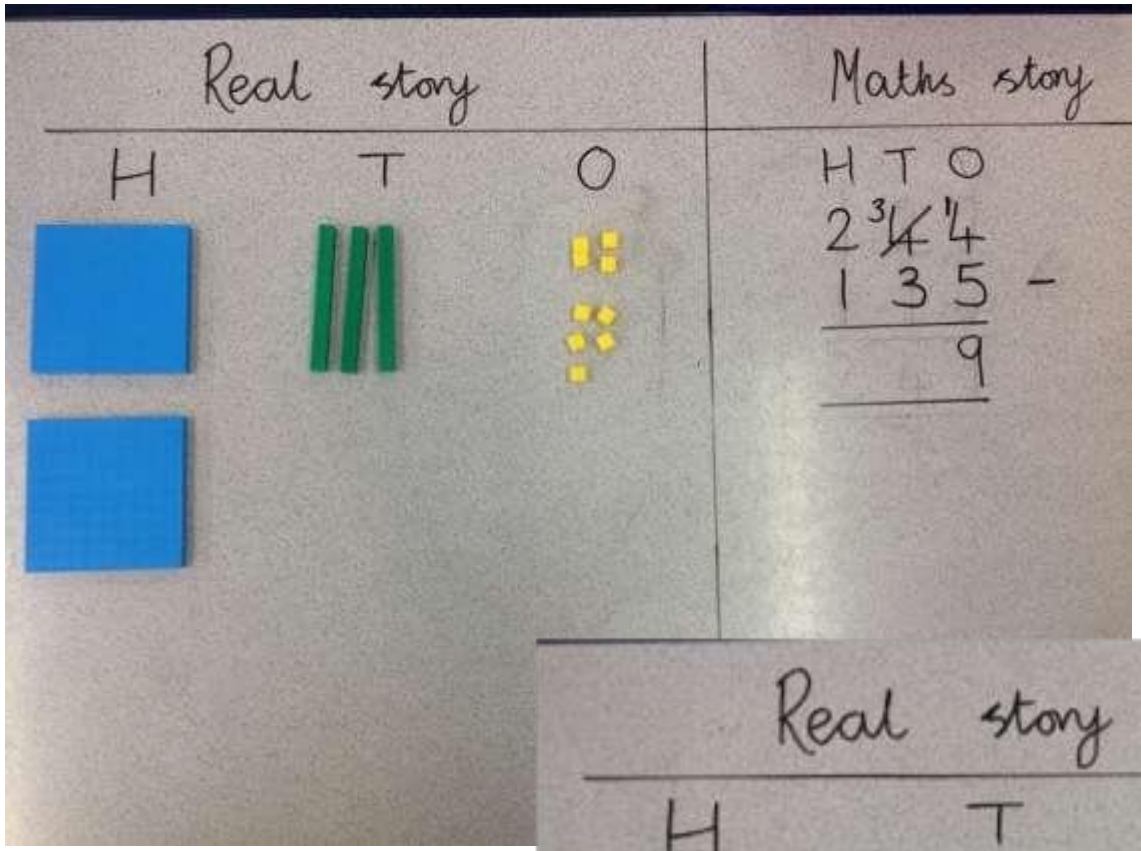


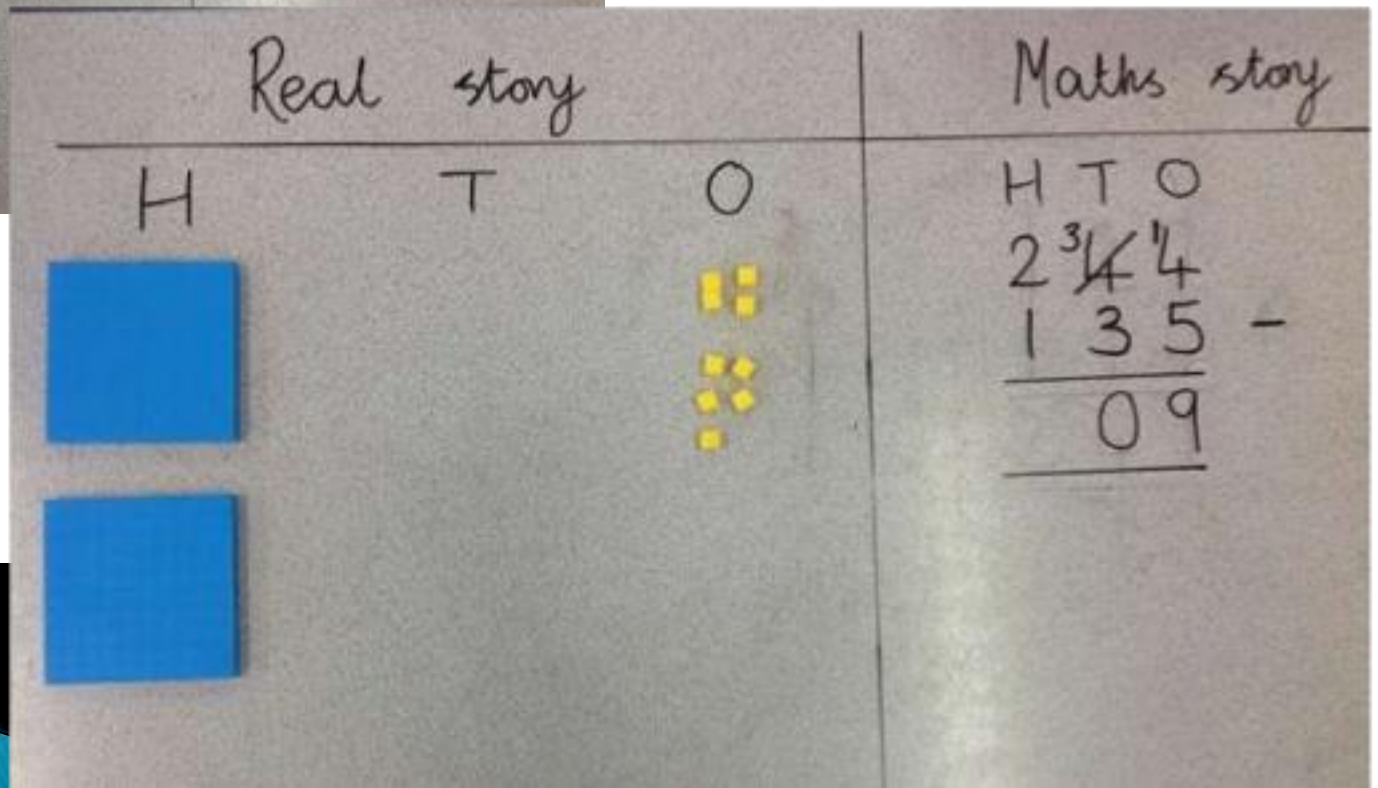
$$\begin{array}{r} {\scriptstyle 6}\not{7}\,{\scriptstyle 1}2 \\ -\ 4\ 7 \\ \hline 2\ 5 \end{array}$$

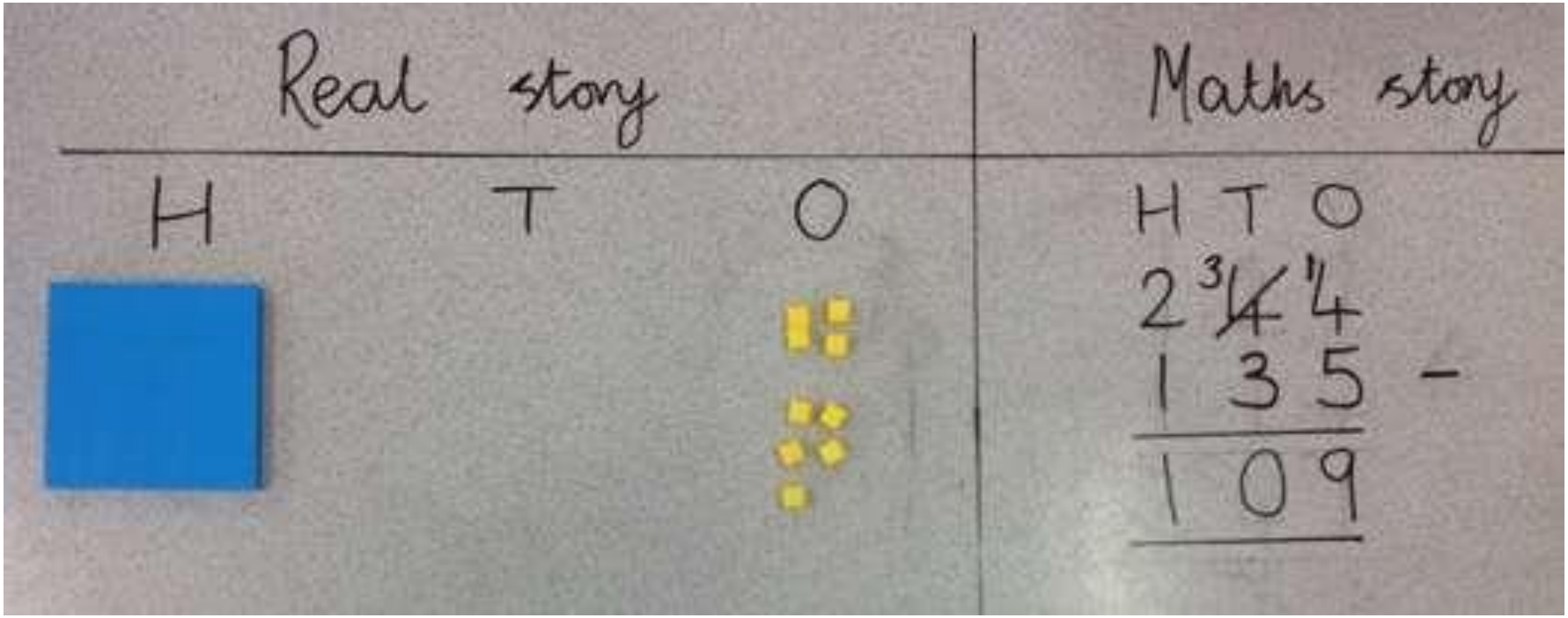
Subtraction






Real story
Maths story
H
T
O
H T O
2 3 1 4
1 3 5 -
9


Real story
Maths story
H
T
O
H T O
2 3 1 4
1 3 5 -
0 9



The Great Times Tables Challenge

Mathstopia

7×6

8×7

7 X 3

8×9

11×12

Times Tables

- Y2 – 10, 5 and 2
- Y3 – 4, 8 and 3
- Y4 – up to 12 x 12

2 x 2 = 4

4 ÷ 2 = 2

How many 2's make 6?

How many 5's are there in 25?

×10	×5	×2	×4	×8	×3	×6	×9	×7

Mathstopia

What do we need to work out tables

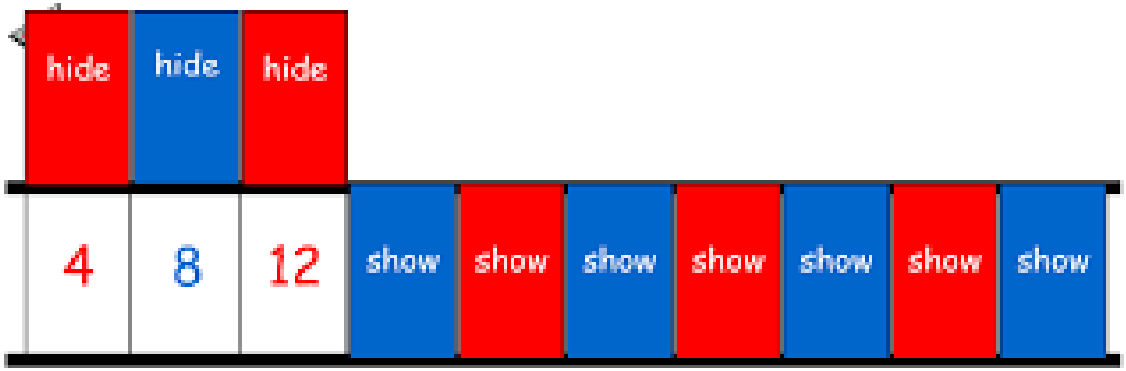
We are in Alphabetland, our number names are: A, B, C …

Try not to ‘translate’ these number names into the banned number names one, two, three, …

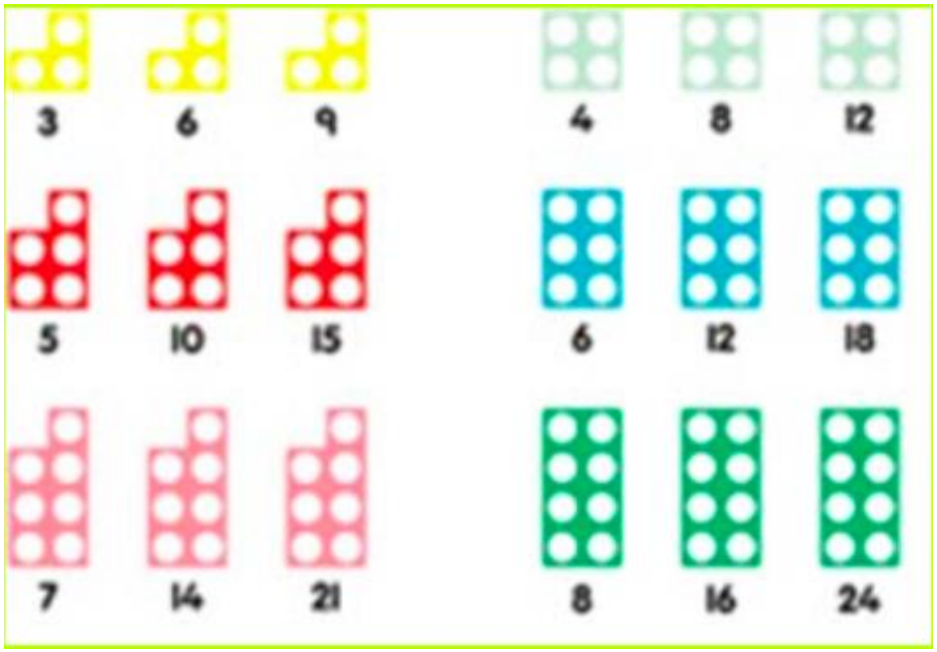
- Count in Bs,
- Count in Cs…

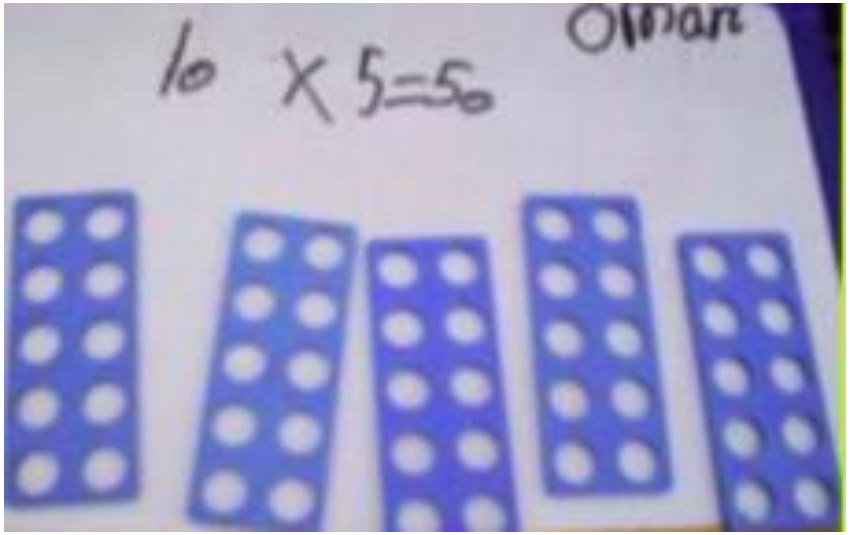
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Skip Counting



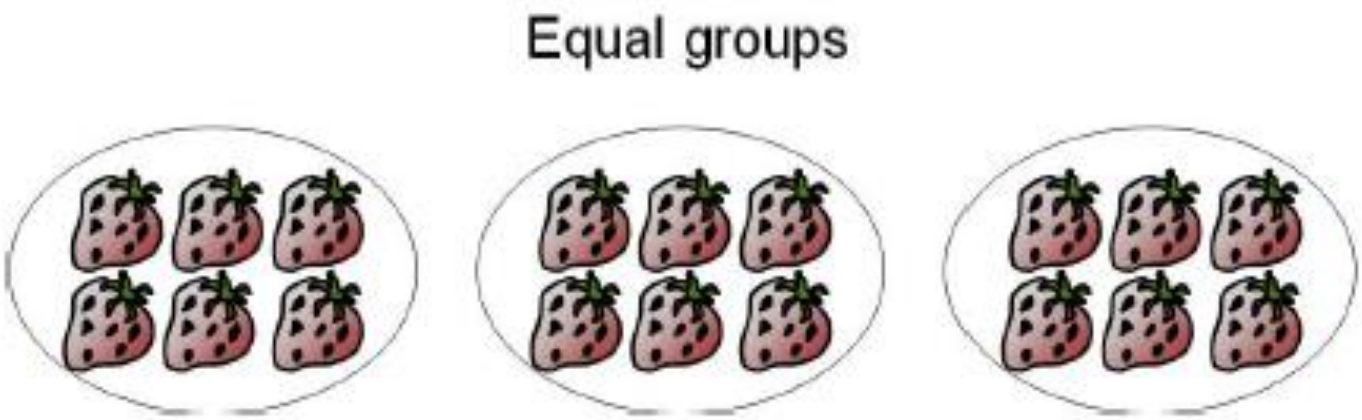
Mathstopia





Mathstopia

Multiplication starts with counting equal groups or 'lots of'



6 + 6 + 6

True or false? ✓ ✗

$5 \times 3 = 15$ ✓

$5 + 5 + 5 = 15$

$3 \times 15 = 5$

$3 \times 5 = 15$

$3 + 3 + 3 + 3 = 15$

Working Memory Problems

Learn key facts:

- 2 times
- 5 times
- 10 times

4	8	12
16	20	24
28	32	36

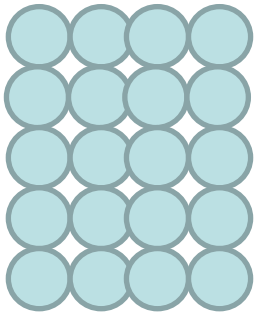
Mathstopia

Multiplication strategies we teach:

Array

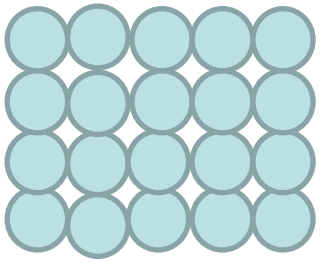
4

5



5

4

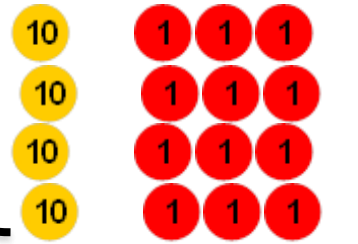


Array to short multiplication

13 x 4 = 52

13

4



40 + 12 = 52

Mathstopia

Multiplication

Solve…

6 x 23 =

Model

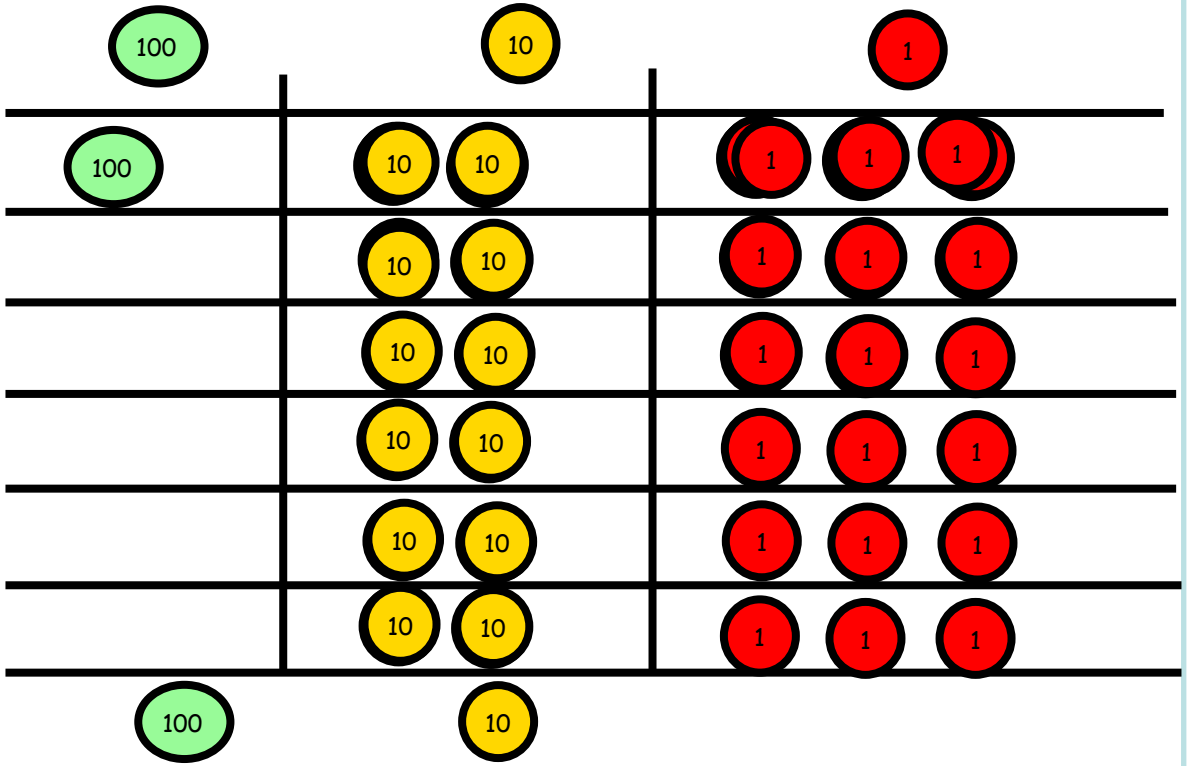
Calculations

Multiplication

Solve…

6 x 23 =

Model



Calculations

6 x 23 =

$$\begin{array}{r} 23 \\ \times \quad 6 \\ \hline 138 \\ \hline 1\ 1 \end{array}$$

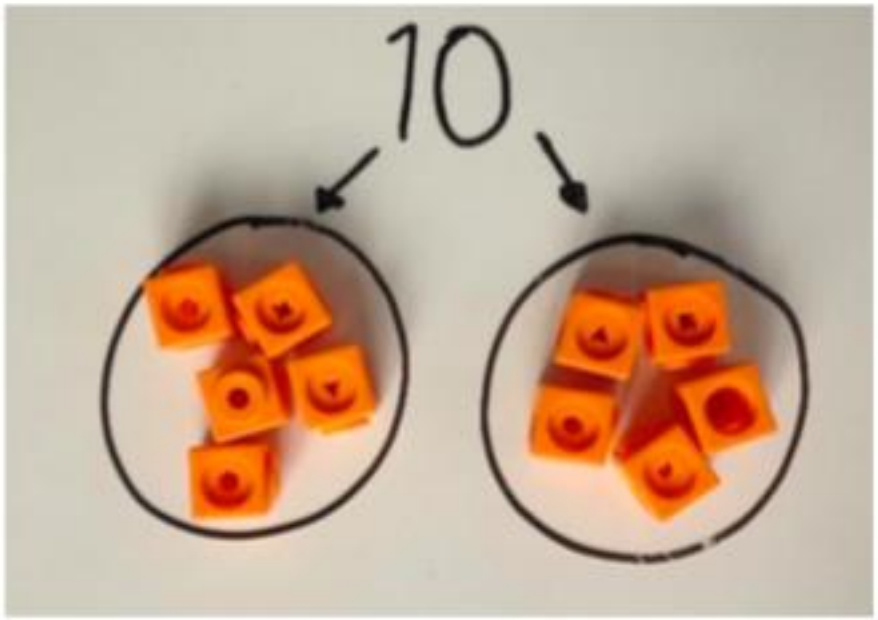
251 x 4 Y4

$$
\begin{array}{r}
251 \\
\times\ 4 \\
\hline
1004 \\
\hline
2
\end{array}
$$

Division as Sharing

Children naturally start their learning of division as division by sharing, e.g. 10 ÷ 2:

$10 \div 2 = 5$

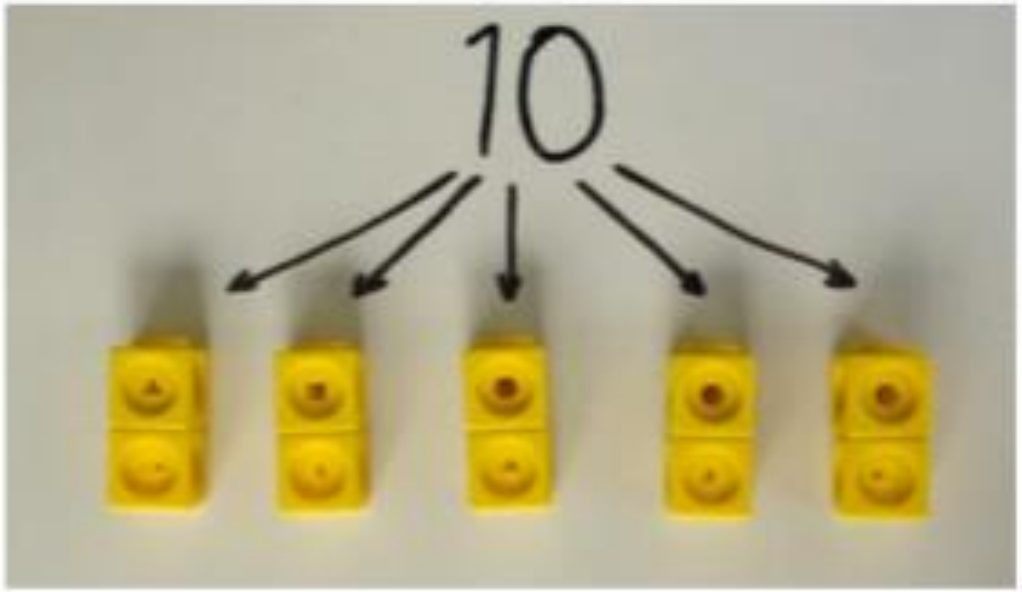


Mathstopia

Division as Grouping

To become more efficient, children need to develop the understanding of division as grouping:

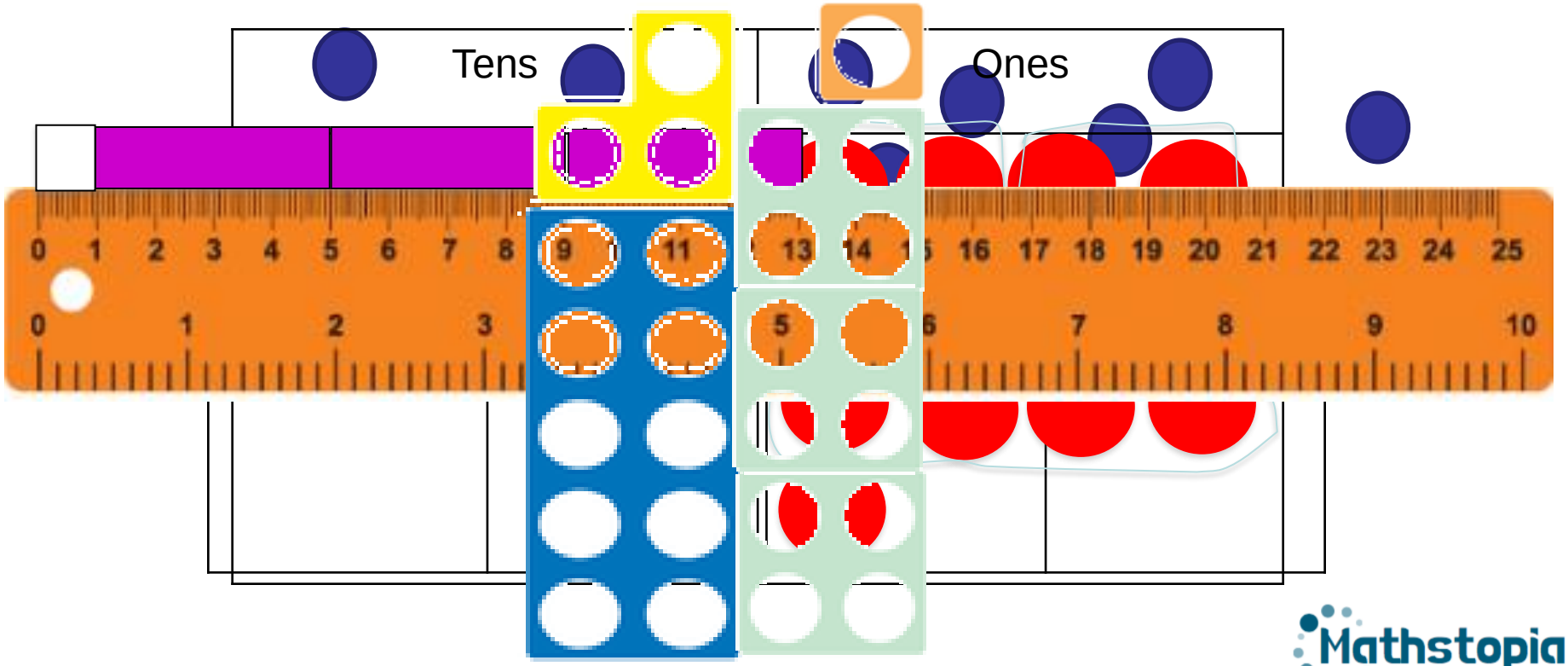
$$10 \div 2 = 5$$



Mathstopia

Multiple representations

$13 \div 4 = 3$ remainder 1



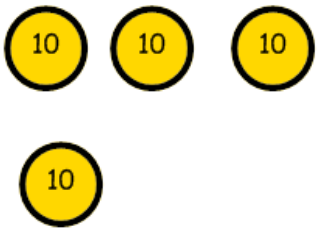
Mathstopia

Division

Solve…

$42 \div 3 =$

Model

H	T	O
		

Calculations

$$3\overline{)42}$$

Division

Solve…

$42 \div 3 =$

Model

H	T	O
	10 10 10 10	1 1

Calculations

$$3\overline{)42}$$

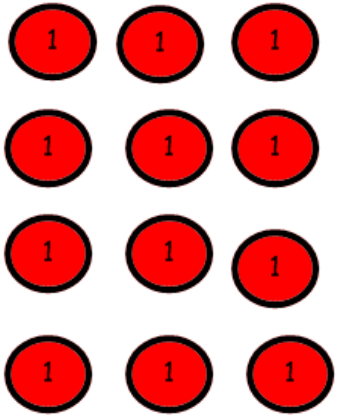
$$1$$

Division

Solve…

$42 \div 3 =$

Model

H	T	O
		

Calculations

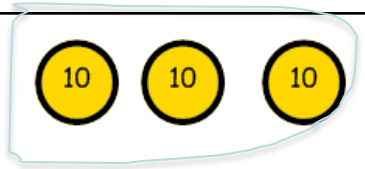
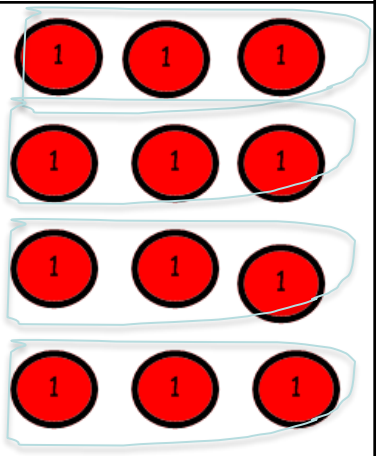
$$3\overline{)4^{1}2}\quad 1$$

Division

Solve…

$42 \div 3 =$

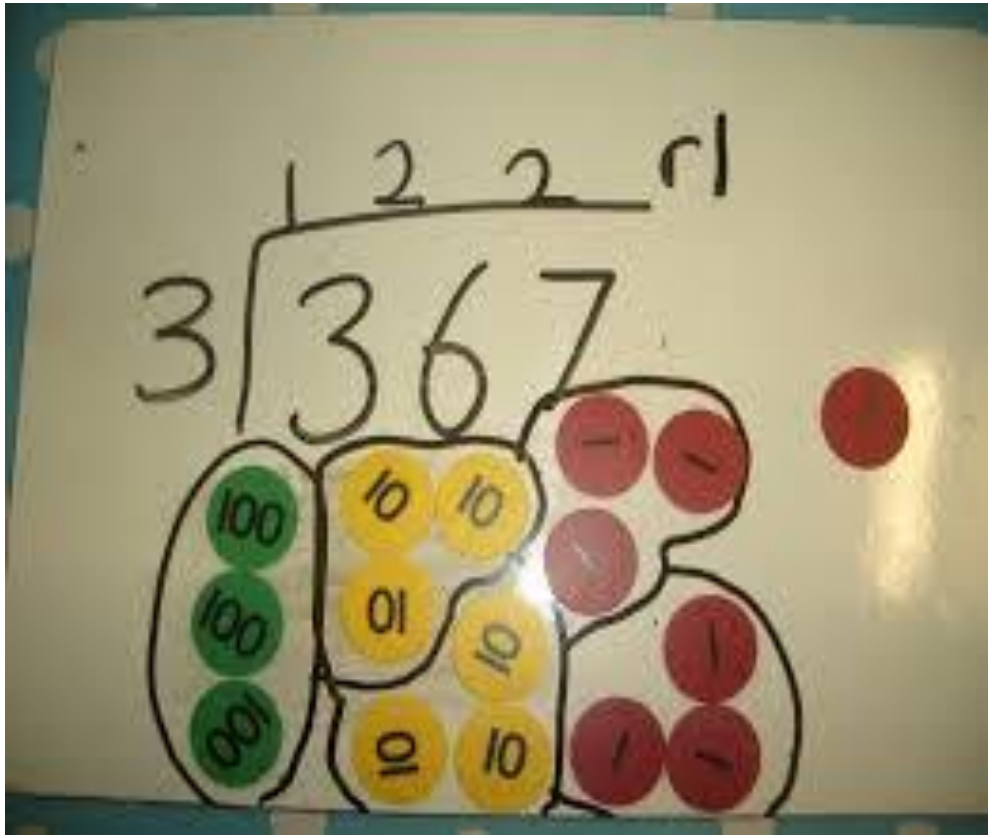
Model

H	T	O
		

Calculations

$$\begin{array}{r} 1\ 4 \\ 3\overline{)\,4^{1}2} \end{array}$$

Year 4



Mathstopia

Fluency = how fast a person can retrieve correct maths facts to working memory from storage memory.

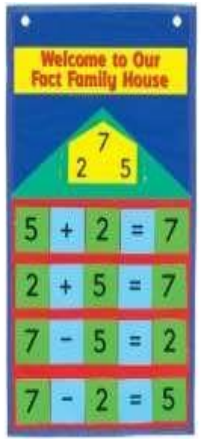
What are the implications for this?

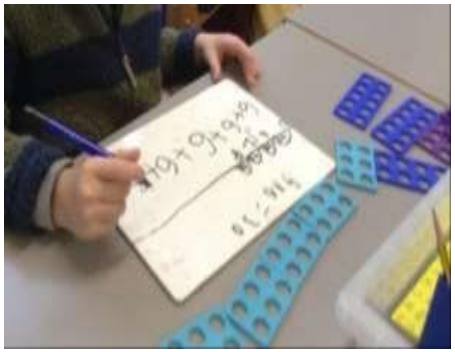
Storing in Long term Memory needs lots of rehearsal, repetition and regular retrieval.

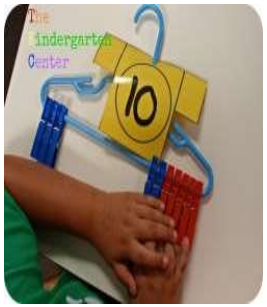
Mathstopia

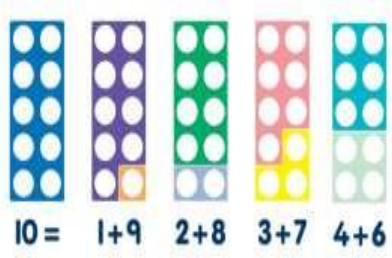
What facts do they need to be able to recall?

- Number bonds
  - Addition and subtraction facts.
- Doubles and halves
- Near doubles
- Skip counting
- Times tables



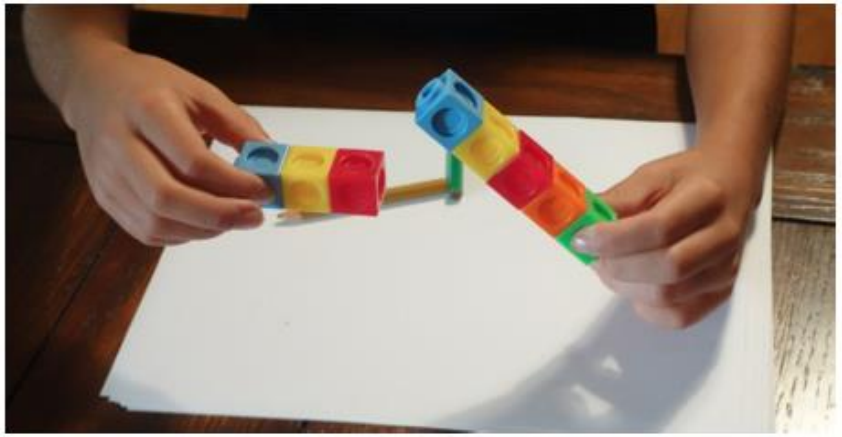






Mathstopia

Snap it!



DICE GAMES

THE ADD AND SUBTRACT GAME

mathsticks.com

You will need:

- 2 players
- 2 sets of counters
- An 'Add and Subtract' game board
- 1 dice

How to play:

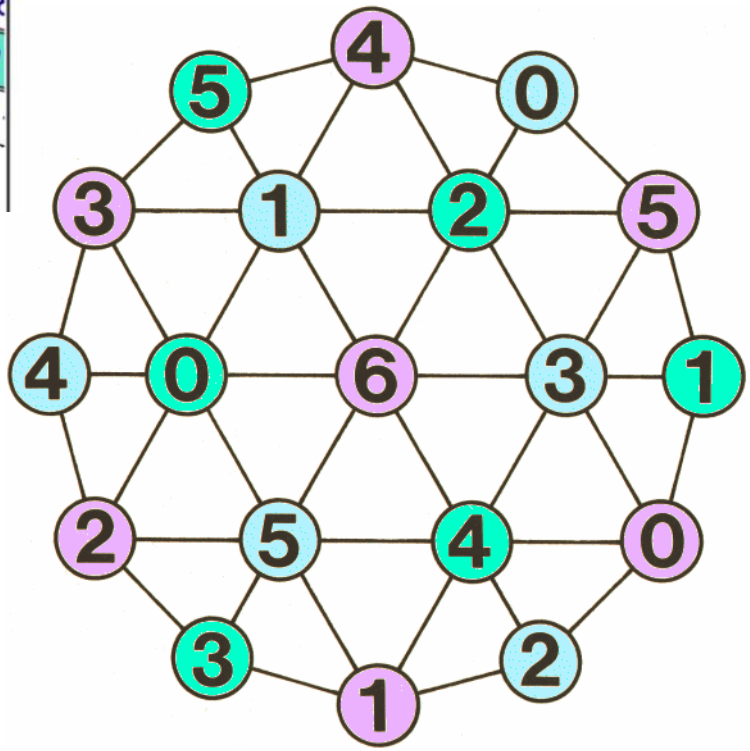
Throw the dice

Look at the grid and find an answer that matches the dice number

Cover that number with a counter

The winner is the player who covers the most numbers.

Totality



Mathstopia

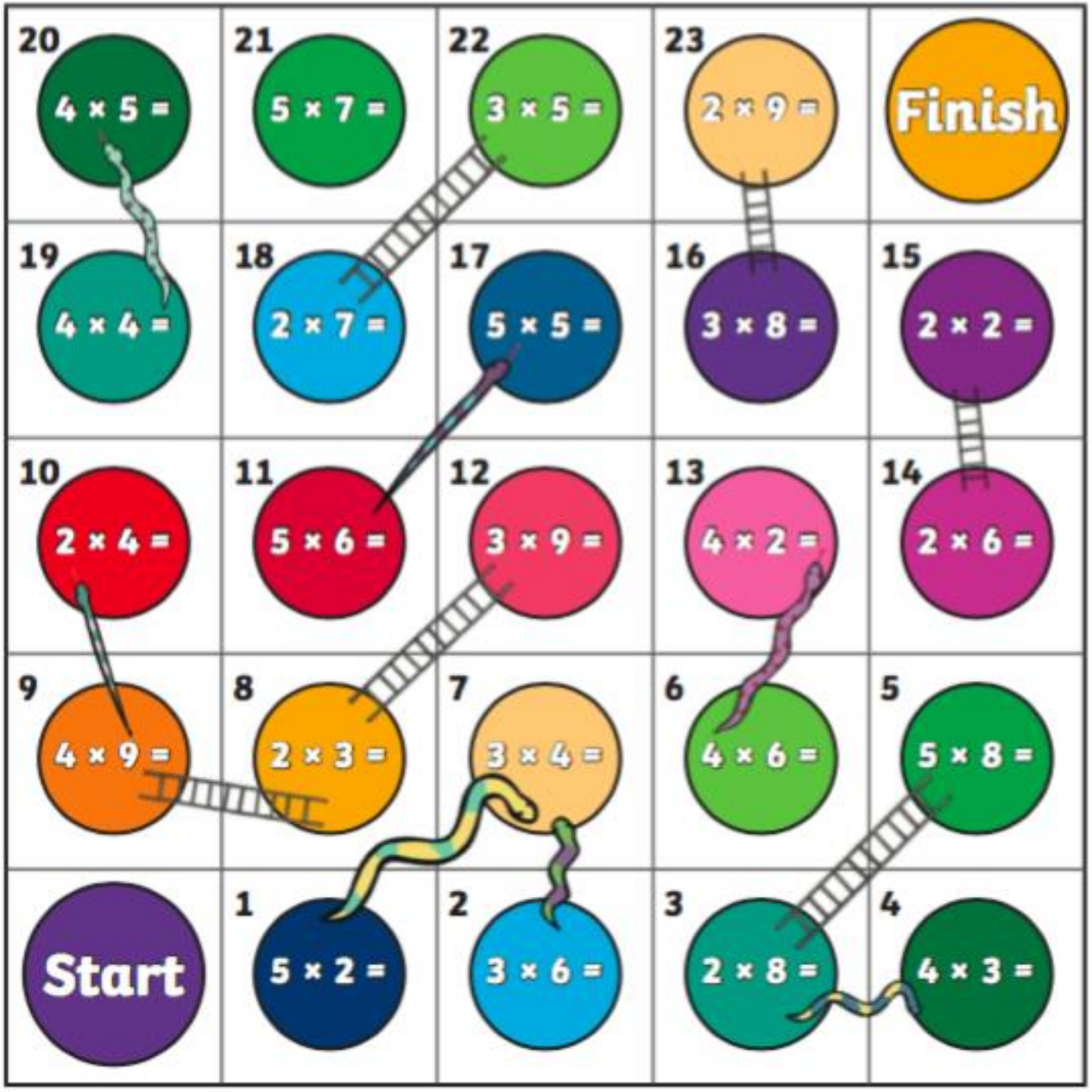
Snakes and Ladders
2, 3, 4 and 5 Times Tables

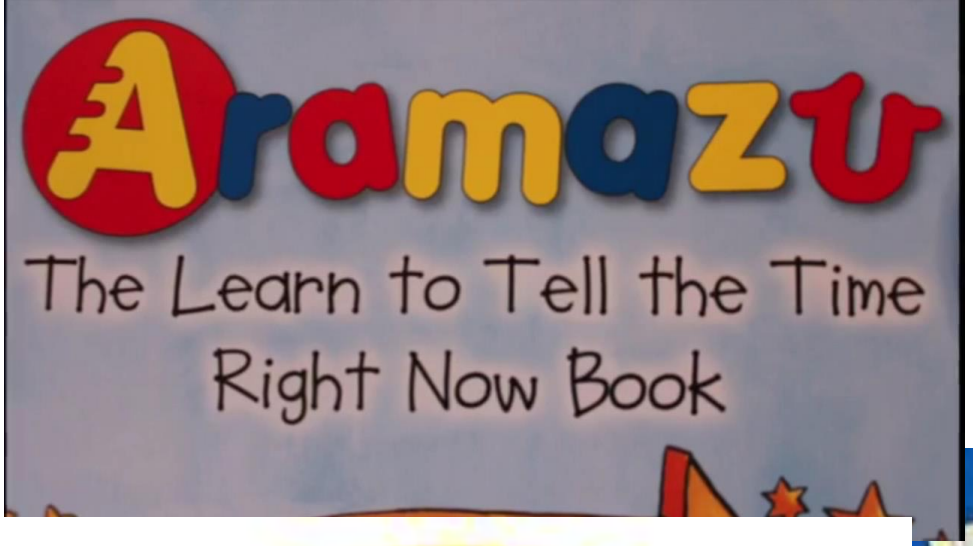
You will need...

- The Snakes and Ladders Board Game board
- A dice
- A counter per player

How to play...

1. Players take it in turns to roll the dice. The player with the highest number goes first, the player with the second highest goes second and so on.
2. When it's their turn, players move the counter the number of spaces shown on the dice and answer the calculation they land on.
3. If the answer given to the calculation is correct, play continues as usual:
   - landing on a snake's head - the player's counter slides down;
   - landing at the bottom of a ladder - the player's counter climbs up.
4. If the answer given to the calculation is incorrect, the player misses a go.
5. The first player to reach the finish is the winner!




Aramazu
The Learn to Tell the Time
Right Now Book


TOP
5
5
10
10
15
15
20
20
25
25
30
12
1
3
4
5
6
7
8
9
10
11


Aramazu
Finds the Hours

Mathstopia

Money

- Saving and having a coin collection
- Shopping and having own purse.
- Coin rubbings activity- cutting & coin recognition
- How many different ways could we make…
- Counting the coin drops into a cup or jar to encourage skip counting 10p, 20p 30p

Measurement

- Using a ruler - drawing a picture with it, measuring the sections, using the ends & scale correctly
- Capacity in the bath!
- Comparing weights when baking or cooking
- Telling the time - having their own watch
- Estimate & compare – longer/shorter/taller than, heavier/lighter than vocabulary

Games and ideas

- Keep maths fun!
- Sudoku puzzles, logic games etc. are far more valuable for helping children with their maths.
- Shopping – find me the cheapest tin of beans, calculate change
- Walking – house numbers, number of steps, cars driving by
- Cooking – doubling/halving quantities, measuring
- Board games and card games
- Problem solving questions
- Guess the number games

Ask questions!

Mathstopia

Props around the home

- A prominent clock- digital and analogue is even better. Place it somewhere where you can talk about the time each day.
- A traditional wall calendar-Calendars help with counting days and spotting number patterns
- Board games
- A pack of playing cards- Card games can be adapted in many ways to learn about number bonds, chance, adding and subtracting
- Measuring Jug-Your child will use them in school, but seeing them used in real life is invaluable. Also useful for discussing converting from metric to imperial

- Dried beans, Macaroni or Smarties- for counting and estimating
- A tape measure and a ruler- Let your child help when measuring up for furniture, curtains etc
- A large bar of chocolate (one divided into chunks) - a great motivator for fractions work
- Fridge magnets with numbers on- can be used for a little practice of written methods
- Indoor/outdoor Thermometer- especially useful in winter for teaching negative numbers when the temperature drops below freezing
- A dartboard with velcro darts- Helps with doubling, trebling, adding and subtracting.

KS1 Dice Games

- Tug of War

http://nrich.maths.org/5897

- Two dice

http://nrich.maths.org/150

- Dotty Six

http://nrich.maths.org/7337/note

- Shut the box

http://nrich.maths.org/6074/note

- Snail One Hundred

http://nrich.maths.org/8303

Mathstopia

Supporting your child at home

Maths Apps

There are thousands of educational apps which will support your child's maths learning. We have selected just a few that we would recommend as being particularly good.

Number Bonds

Bubble Pop Number Bonds (free)
Wipeout Wall Addition and Subtraction (69p)
Number Bonds and Fact Families (69p)
Number Bonds Pro (£1.49)

All 4 Operations

6 Numbers (free)
Pop Maths Lite (free)
Mathletics (free)
Super Tiles (69p)

Click on the links below to be taken directly to the App Store

Mathstopia

Supporting your child at home

Maths Apps

Times Tables

Tables Lite (free)
Cloud Tables (free)
DK Times Tables (free)
Wipeout Wall Multiplication and Division (69p)
Eggs on Legs (69p)
Table Mountain (69p)
Division Descent (69p)
Frontier Factors (69p)

Shape

Banana Hunt (69p)
Billy Bug and his Quest for Grub (69p)
Beebot (69p)

Telling the Time

Telling Time Quiz (free)
Stop the Clock (free)
Interactive Telling Time Lite (free)

Mathstopia

Supporting your child at home

Board Games and Card Games

Here are a few ideas for board games and card games that you can buy to play at home. All these games are fun to play but also develop essential maths skills including number, shape and problem solving.

Games that you can buy:

Battleships
Rush Hour
Connect Four
Trionimos
Swish
Square by Square
Addition Snap
Maths Snap Plus
Fraction Action Snap
Monopoly Junior

Uno
Rubiks Cubes
Dominoes
Hexago Continuo
Quirkle
Shape by Shape
Subtraction Snap
Four Function Snap
Times Tables Snap

Click the links to go directly to Amazon

Mathstopia

Websites For Parents

- National Numeracy Parent Toolkit has a wealth of tips and advice for parents.

http://www.nnparenttoolkit.org.uk/

- Oxford Owl includes a range of activities, top tips and eBooks simple ideas, to help your child with their maths at home.

http://www.oxfordowl.co.uk/maths-owl/maths

- Maths 4 Mums and Dads explains some of the milestones children make between the ages of 3-and-11-years-old.

http://www.maths4mumsanddads.co.uk/index.php

- Nrich. A range of maths games, problems and articles on all areas of maths. Parents of Key Stage 1 children should select 'stage 1'.

http://nrich.maths.org/frontpagehttp:

http://www.mathsnoproblem.co.uk/parent-videos

Mathstopia

Websites For Children

http://www.amathsdictionaryforkids.com/
http://www.bbc.co.uk/bitesize/ks1/maths/
http://www.ictgames.com/resources.html
http://www.ilovemathsgames.com/
http://www.mathsisfun.com/index.htm
http://www.mathszone.co.uk/
http://www.multiplication.com/
http://www.primarygames.co.uk/
http://resources.woodlands-junior.kent.sch.uk/maths
http://www.topmarks.co.uk/

Mathstopia