Calculation Policy

Spirit Federation

Contents

Introduction

This calculation policy sets out a consistent, progressive approach to teaching addition, subtraction, multiplication and division across the school. It connects practical equipment, visual representations, mental strategies and written methods to develop understanding, fluency and confidence. Shared vocabulary and carefully sequenced approaches help pupils build on prior learning and make connections between concepts. The policy supports teachers and parents in guiding children's learning, while allowing flexibility to meet individual needs and ensure pupils progress securely.

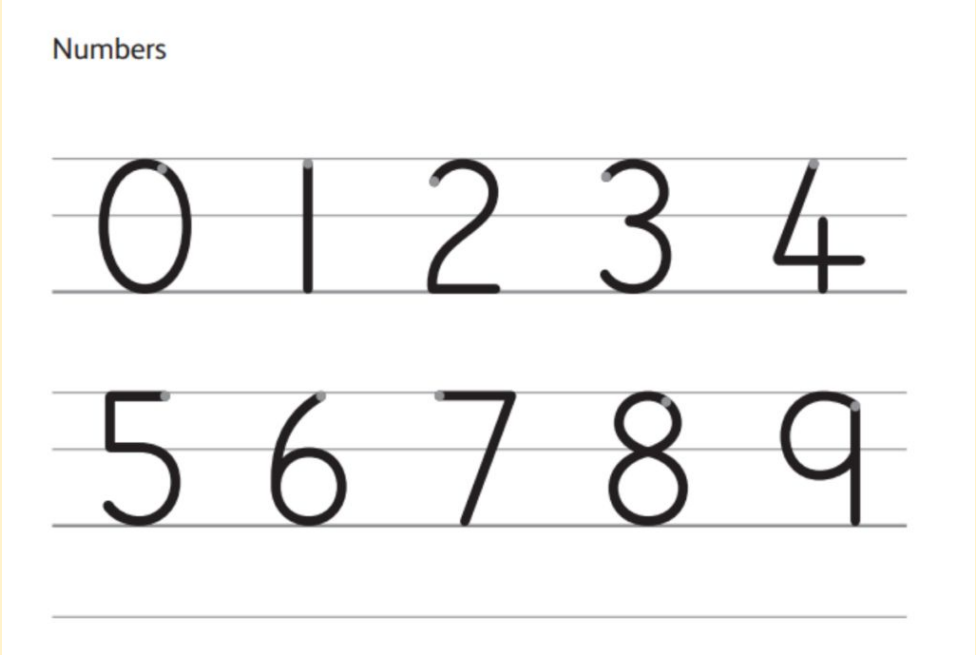
Contents

Introduction	**Page 2**
Number formation	Page 4
Early Maths	Page 5
Addition	Page 18
Fundamental structures	Page 21
Manipulatives	Page 31
Written methods	Page 34
Videos	Page 43
Subtraction	Page 48
Fundamental structures	Page 51
Manipulatives	Page 61
Written methods	Page 64
Videos	Page 73
Multiplication	Page 78
Fundamental structures	Page 81
Manipulatives	Page 88
Written Methods	Page 95
Videos	Page 106
Division	Page 108
Fundamental structures	Page 111
Manipulatives	Page 122
Written Methods	Page 126
Videos	Page 134
Key terms definitions	Page 138
Appendix	Page 142

Number Formation

Number formation helps children record mathematical thinking clearly and confidently. Recognisable numerals reduce confusion and errors, while fluent formation allows children to focus on counting, calculating and solving problems. Clear digits also support place value and written calculations later.

Reception is an important starting point because children are establishing writing habits. Teaching consistent starting points and movements helps prevent habits that become harder to change. Short, practical activities develop familiarity and fine motor control. Formation must be taught alongside understanding what numbers represent, with appropriate support.



Early Maths

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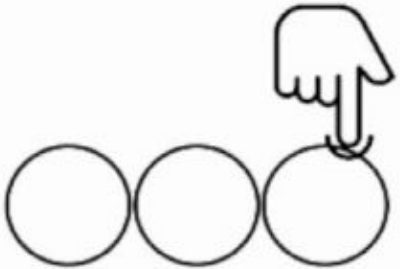
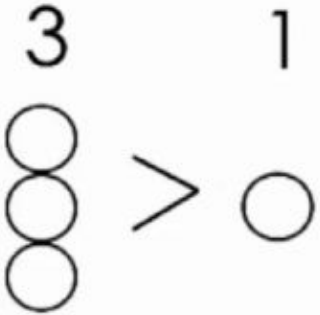
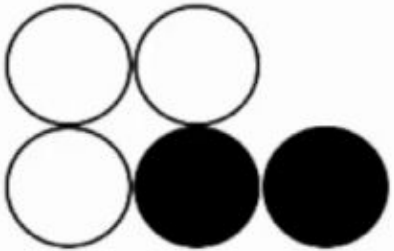
Number Sense



counting

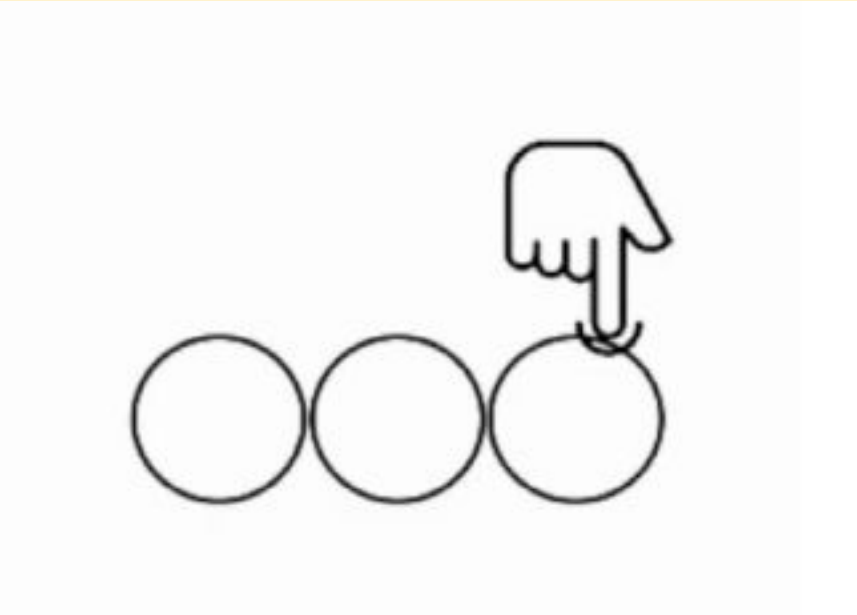


comparing

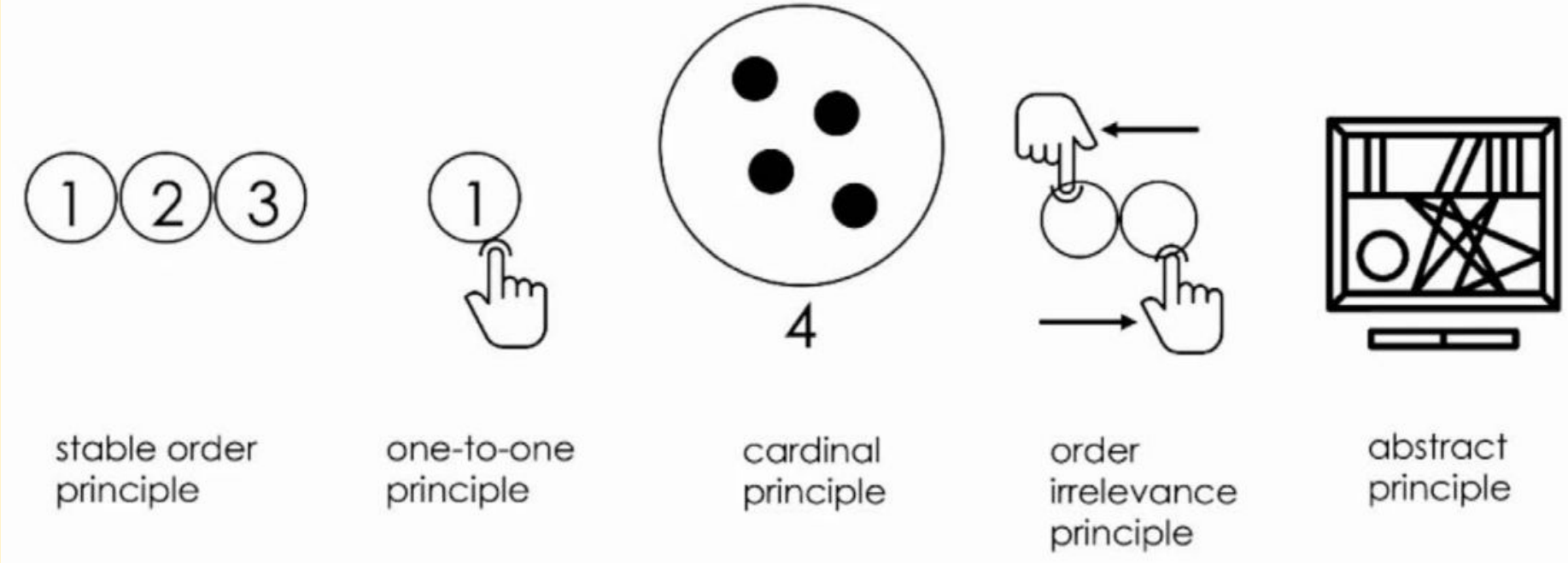


composition

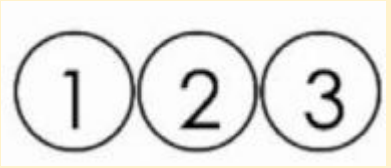
Counting



The Five Principles of Counting
What are they?



The Five Principles of Counting
1. The Stable Order Principle

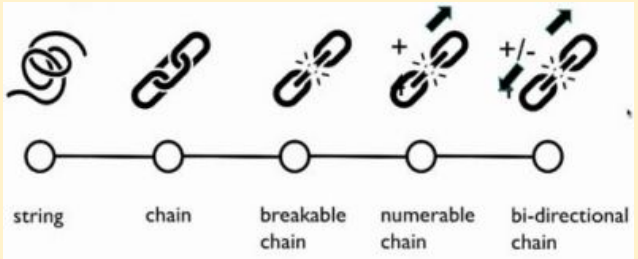


Children understand when counting the numbers have to be said in a certain order.

Children need to understand that, when counting, each number represents a different value.
This principle is split into 5 stages:

Video here

1. String - recalling a counting song or rhyme
2. Chain - counting from 1 understanding each number represents a certain value
3. Breakable Chain - starting from any number and counting on
4. Numerable chain - start at a number and count so many more
5. Bi-directional Chain - start at a number and count so many less.



The Five Principles of Counting
2. The One-to-One Principle



This involves children assigning one number name to each object that is being counted. Children need to ensure that they count each object only once ensuring they have counted every object.

Children will sometimes count objects more than once or miss an object out that needs to be counted.

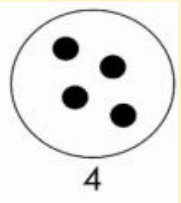
Encourage children to line up objects and touch each one as they count saying one number name per object.

This will also help to avoid children counting more quickly than they touch the objects which again shows they have not grasped one-to-one correspondence.

Other ideas; count linear, circular, mixed.

Video here

The Five Principles of Counting
3. The Cardinal Principle



Children understand that the number name assigned to the final object in a group is the total number of objects in that group.

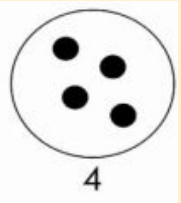
In order to grasp this principle, children need to understand the one-one and stable-order principle.

After counting a group of objects and asking ‘how many?’, children should be able to recall the final number they said.

Children who have not grasped this principle will recount the whole group again

Video here

The Five Principles of Counting
4. The Order-Irrelevance Principle



This involves children understanding that the order we count a group of objects is irrelevant. There will still be the same number.

Encourage children to count objects, left to right, right to left, top to bottom and bottom to top.

Once children have counted a group, move the objects and ask children how many there are, if they count them all again they have not fully grasped this principle.

Video here

The Five Principles of Counting
5. The Abstraction Principle



This involves children understanding that anything can be counted including things that cannot be touched including sounds and movements, e.g. jumps.

When starting to count, many children rely on touching the objects in order to count accurately.

Teachers can encourage abstraction on a daily basis by counting claps or clicks.

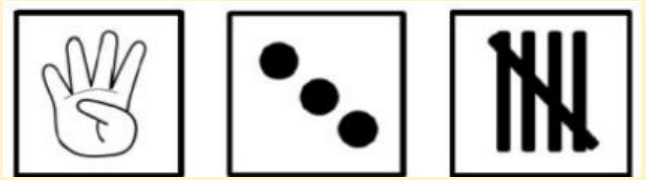
They can also count imaginary objects in their head to encourage counting on, this involves the children visualising objects.

Video here

Subitising
Perceptual Subitising



Perceptual Subitising is being able to recognise immediately what number is represented.



Video here

Subitising can help children to build images for numbers, to visualise and to learn number facts.

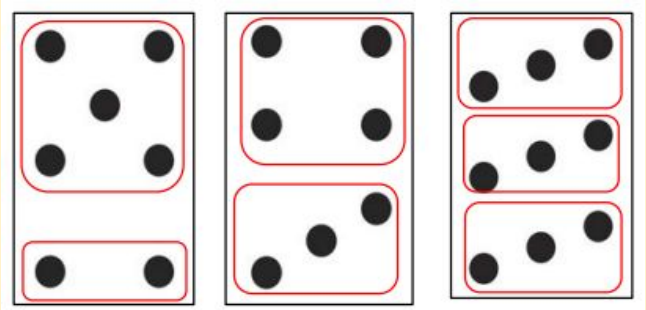
We need to regularly show children different ways of representing numbers to 5, in order for them to be able to subitise.

We should use a range of representations to show this; cubes, numicon, bead strings, dice, fingers, cubes, everyday objects.

Subitising
Conceptual Subitising



Conceptual Subitising is immediately recognising smaller amounts and putting them together in your head to find the total.



Subitising can also help children learn addition and subtraction facts.

This involves part-whole awareness, which enables children to simultaneously see the whole number and numbers which make it up.

Seeing numbers as combinations of other numbers helps build familiarity with number combinations. It is also much more effective than giving children number sentences to complete by counting cubes and hoping they will remember the numbers involved

Comparing

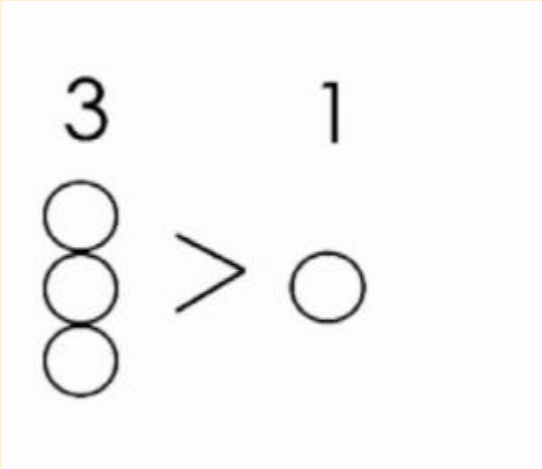
Children look at numbers or groups of objects and can see which are bigger/greater and which are smaller/less.

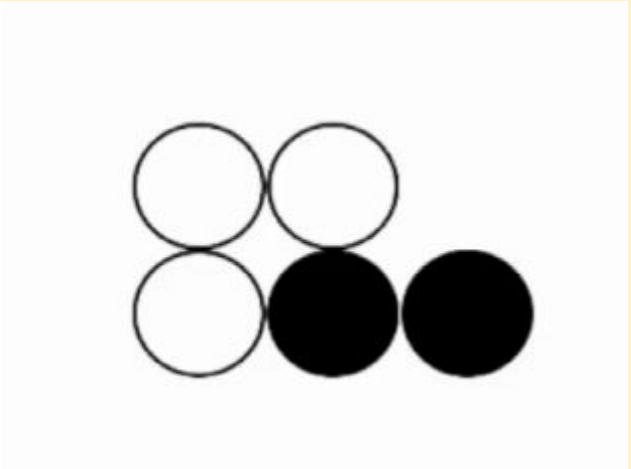
Composition

Composition is the understanding that a number contains within it other numbers.

Composition and comparing numbers/objects is built on a foundation of children being able to subitise.

Comparing & Composition





Addition

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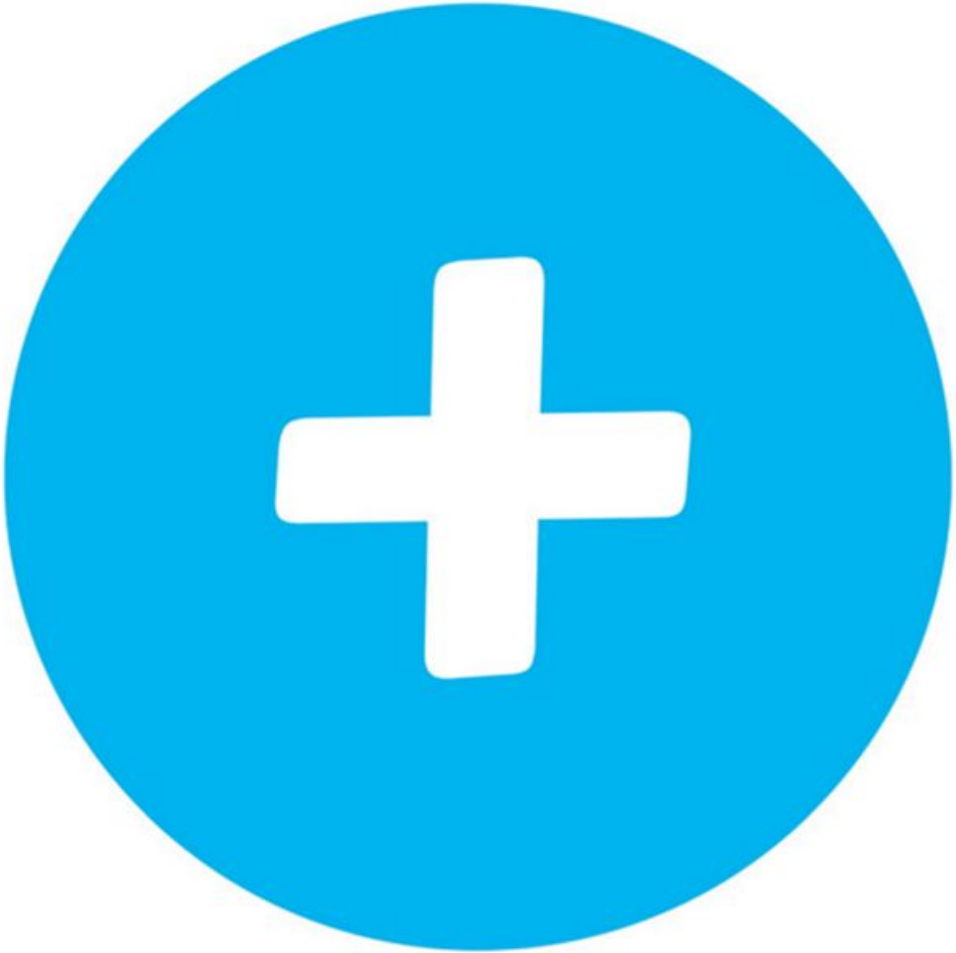
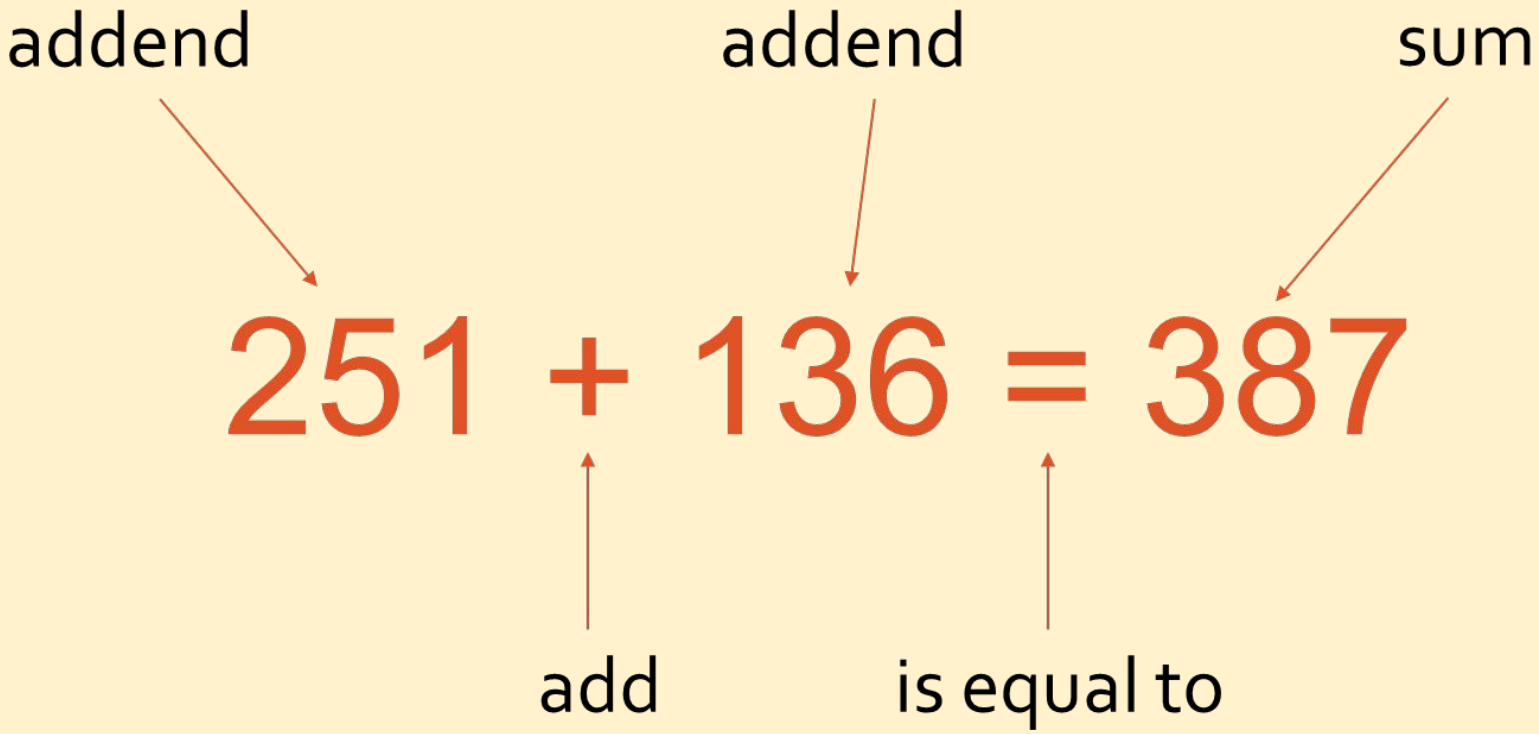
- add
- more
- plus
- make
- sum
- total
- altogether




addend
addend
sum
251 + 136 = 387
add
is equal to

Fundamental Structures

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Aggregation

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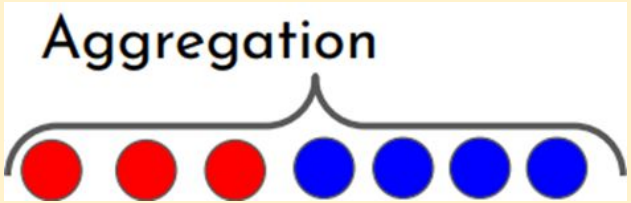
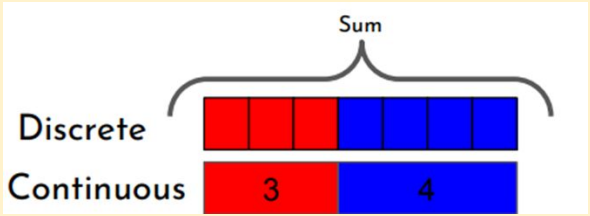
Key Stage 1 Keywords Altogether Total Sum

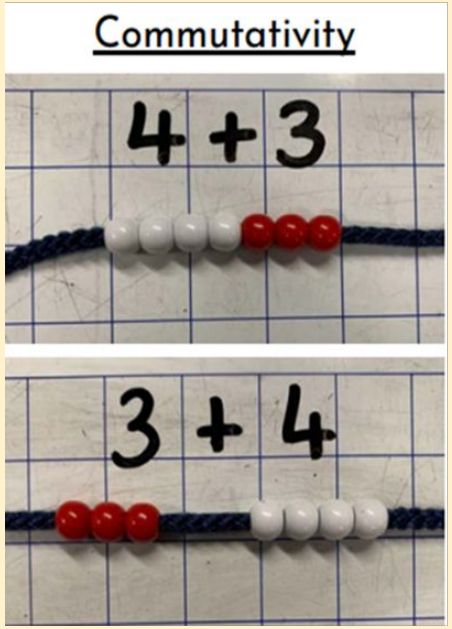


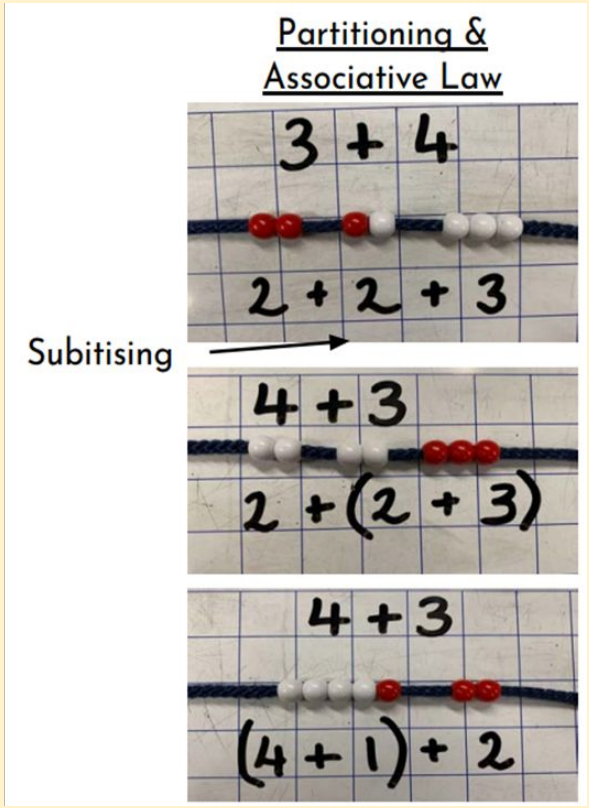
Word problem

Gracie has 3 stickers in her pocket and 4 stickers in her hand.

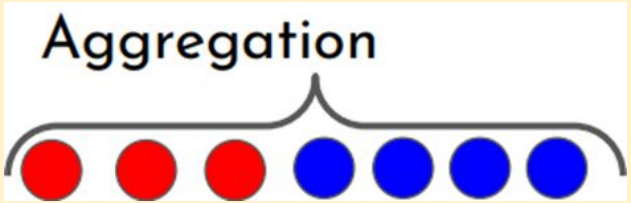
How many does she have altogether?







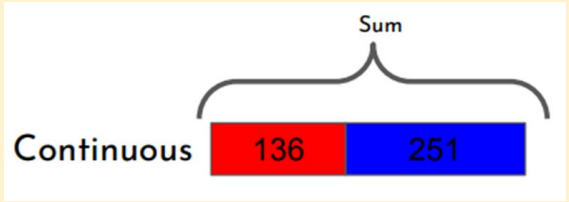
Key Stage 2 Keywords Altogether Total Sum



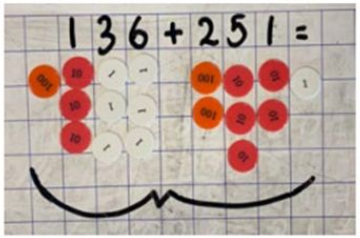
Word problem

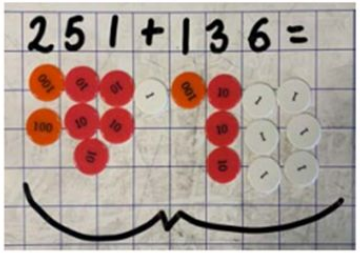
Piotr takes 251 conkers, followed by a further 136 conkers.

What is the total amount of conkers?

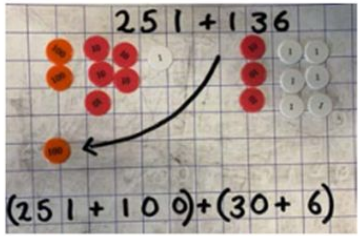


Commutativity

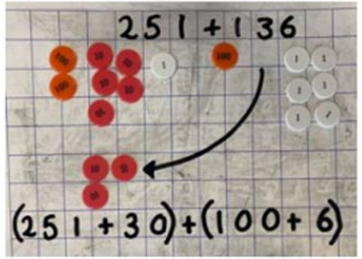




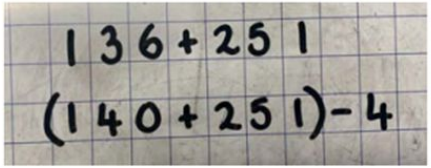
Partitioning & Associative Law



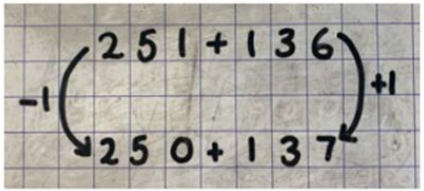
Associative Law



Compensation



Constant difference



Augmentation

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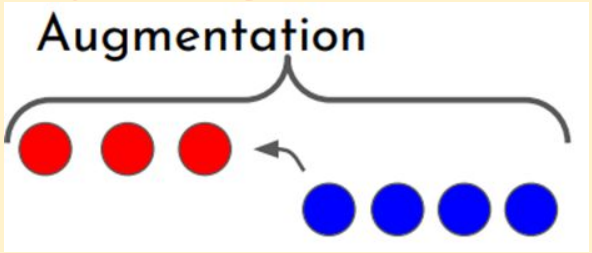
Key Stage 1

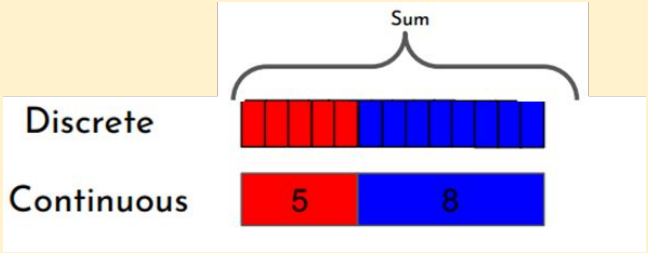
Keywords Increase How many more More Greater Taller Longer Heavier

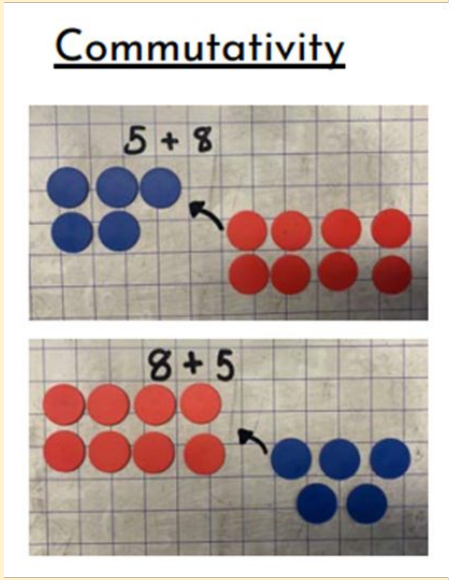


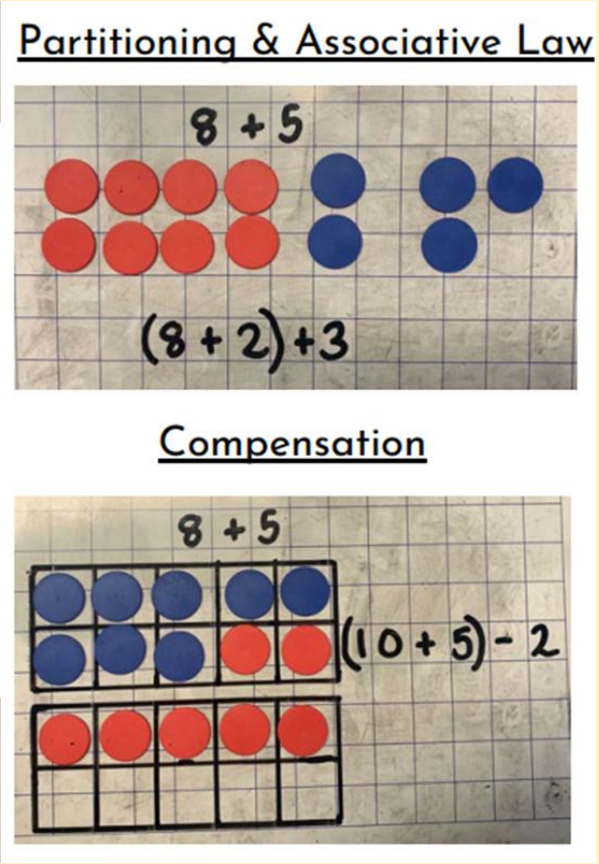
Word problem

Raul wants to pay the shopkeeper with five coins. He doesn't have enough. His mother gives him 8 more.

How many coins does he have now?

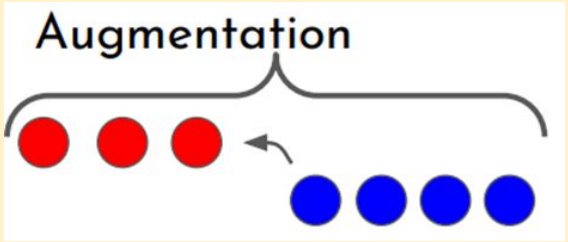






Key Stage 2

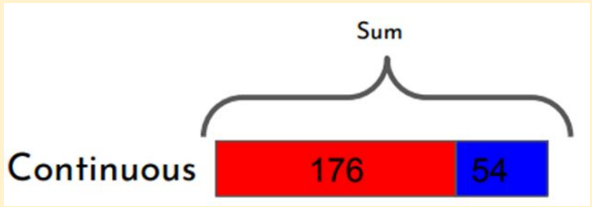
Keywords Increase How many more More Greater Taller Longer Heavier



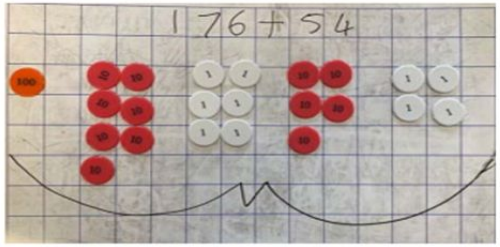
Word problem

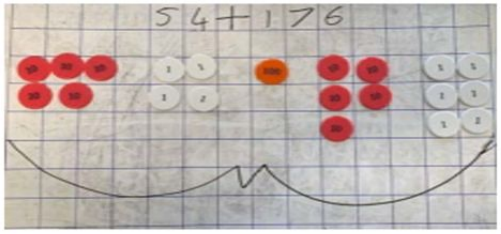
Sebastian has £176 and receives an increase of £54.

How much does he have now?

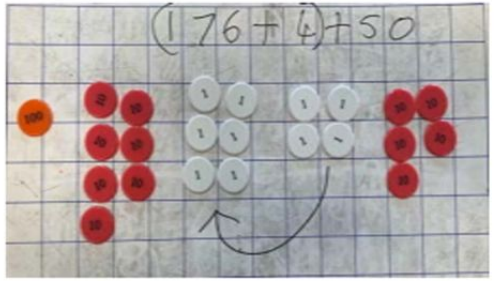


Commutativity

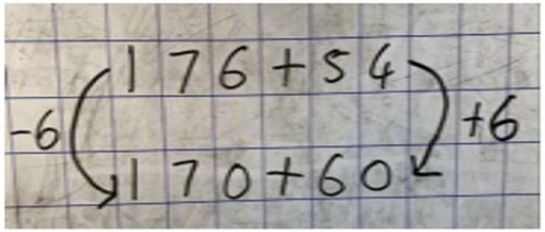




Partitioning & Associative Law



Constant difference



Comparison

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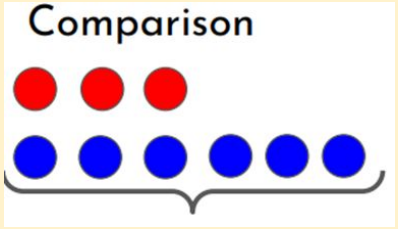
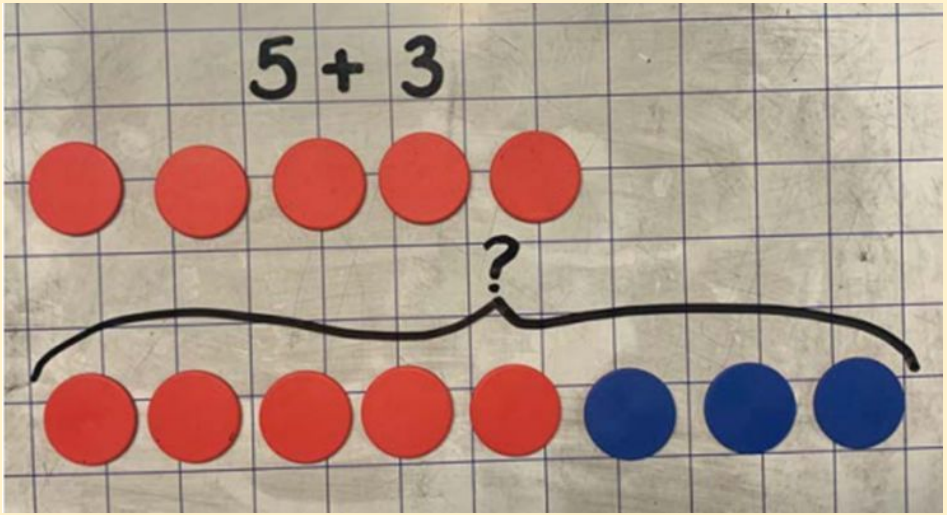
Key Stage 1 Keywords Altogether Total Sum

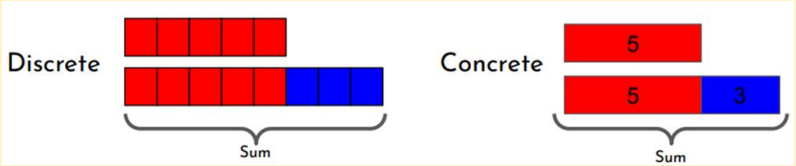


Word problem

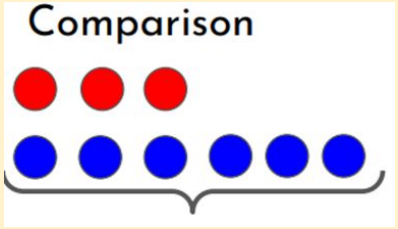
Benjamin has 5 tickets in Folder A and 3 more in Folder B than in Folder A.

How many does he have in Folder B?





Key Stage 2 Keywords Altogether Total Sum



Word problem

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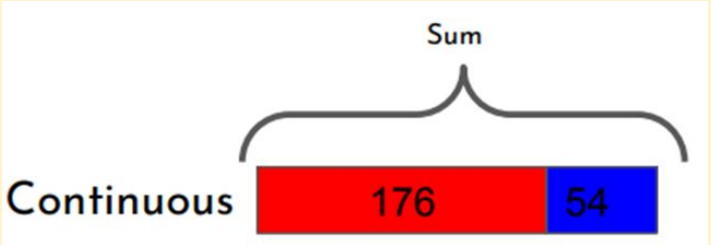

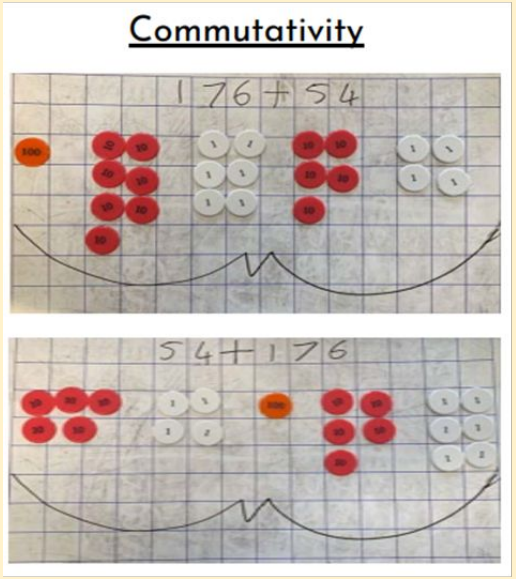

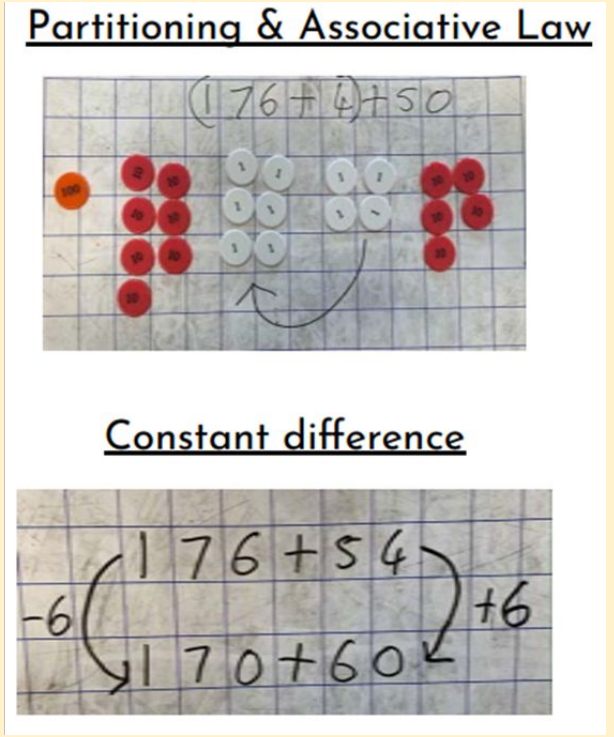

Manipulatives

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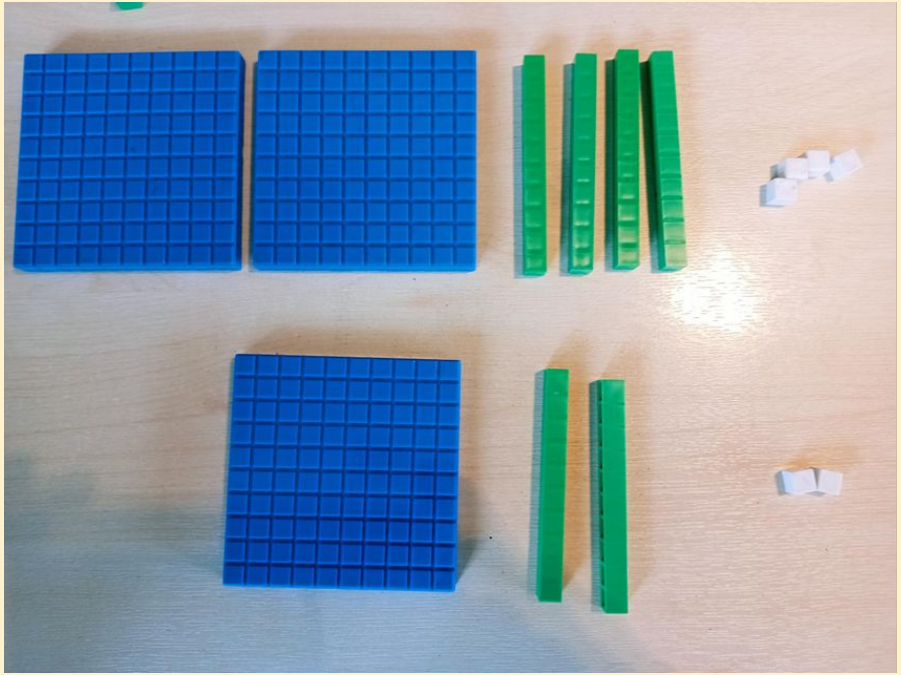
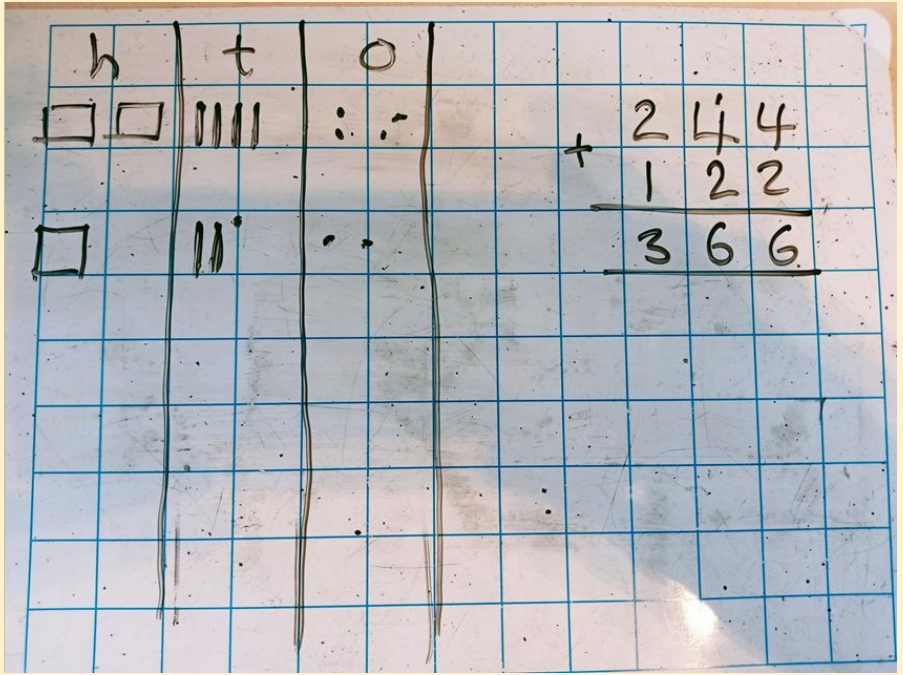
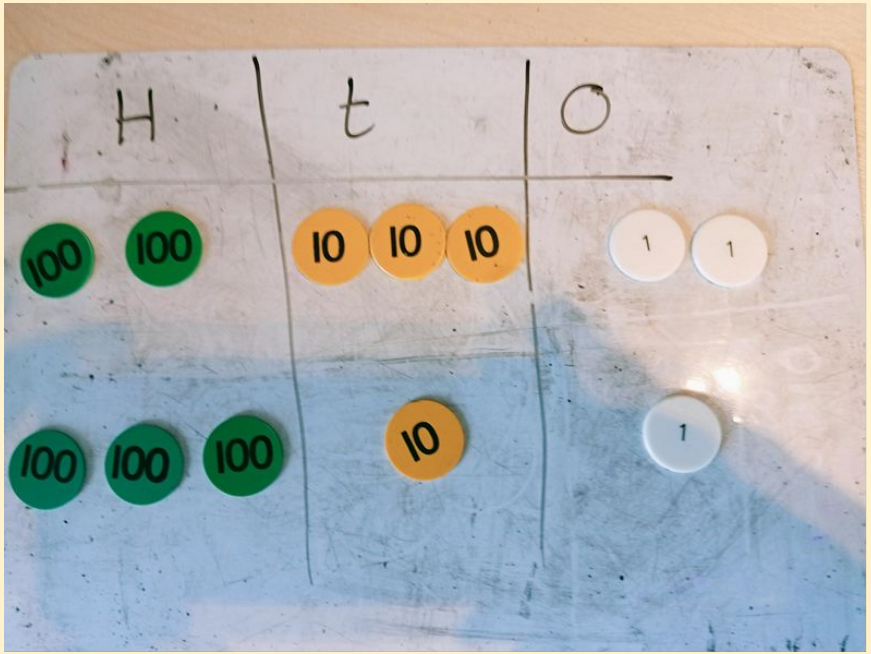
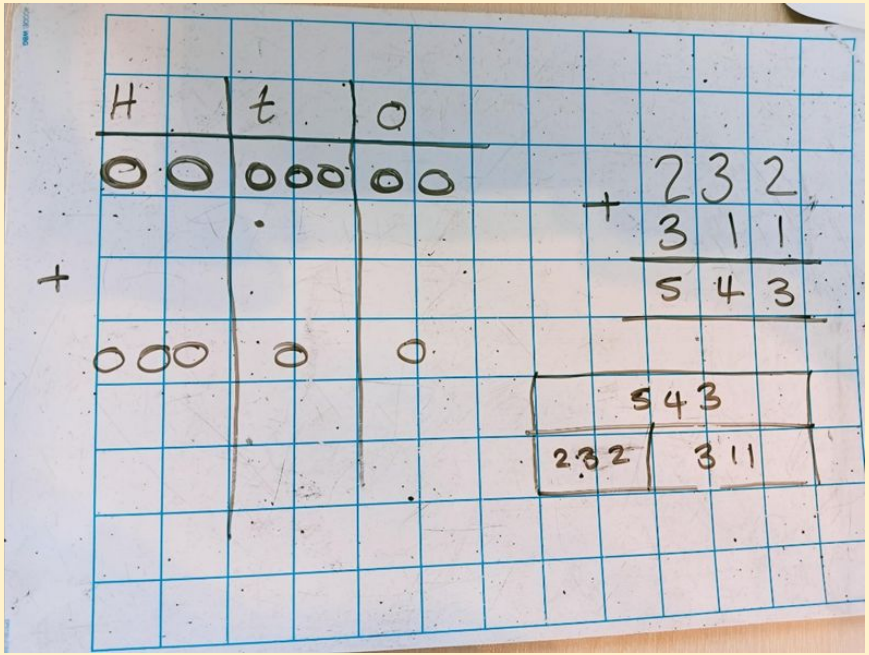
Key Stage 2 Manipulatives





Key Stage 2 Manipulatives

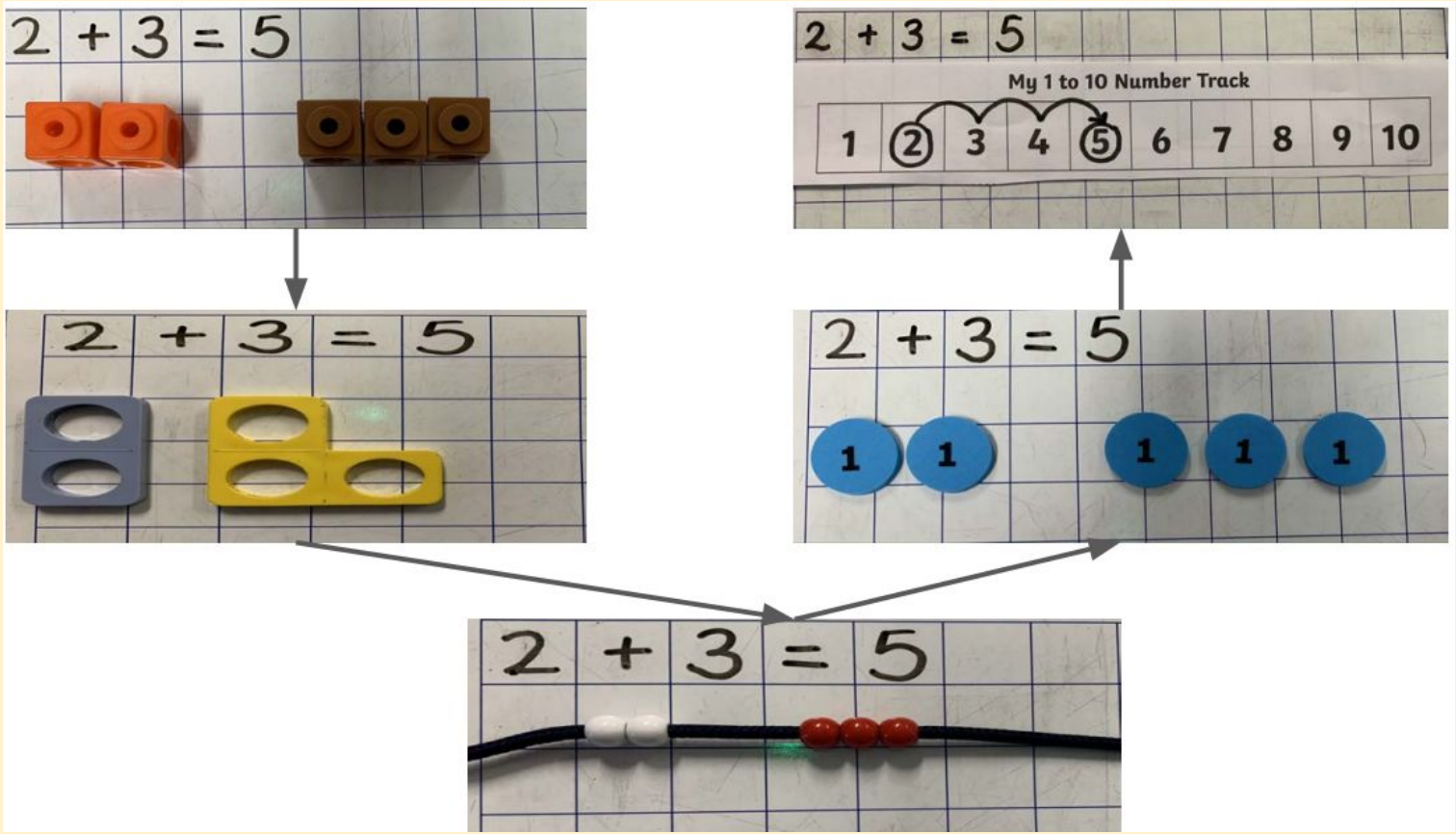




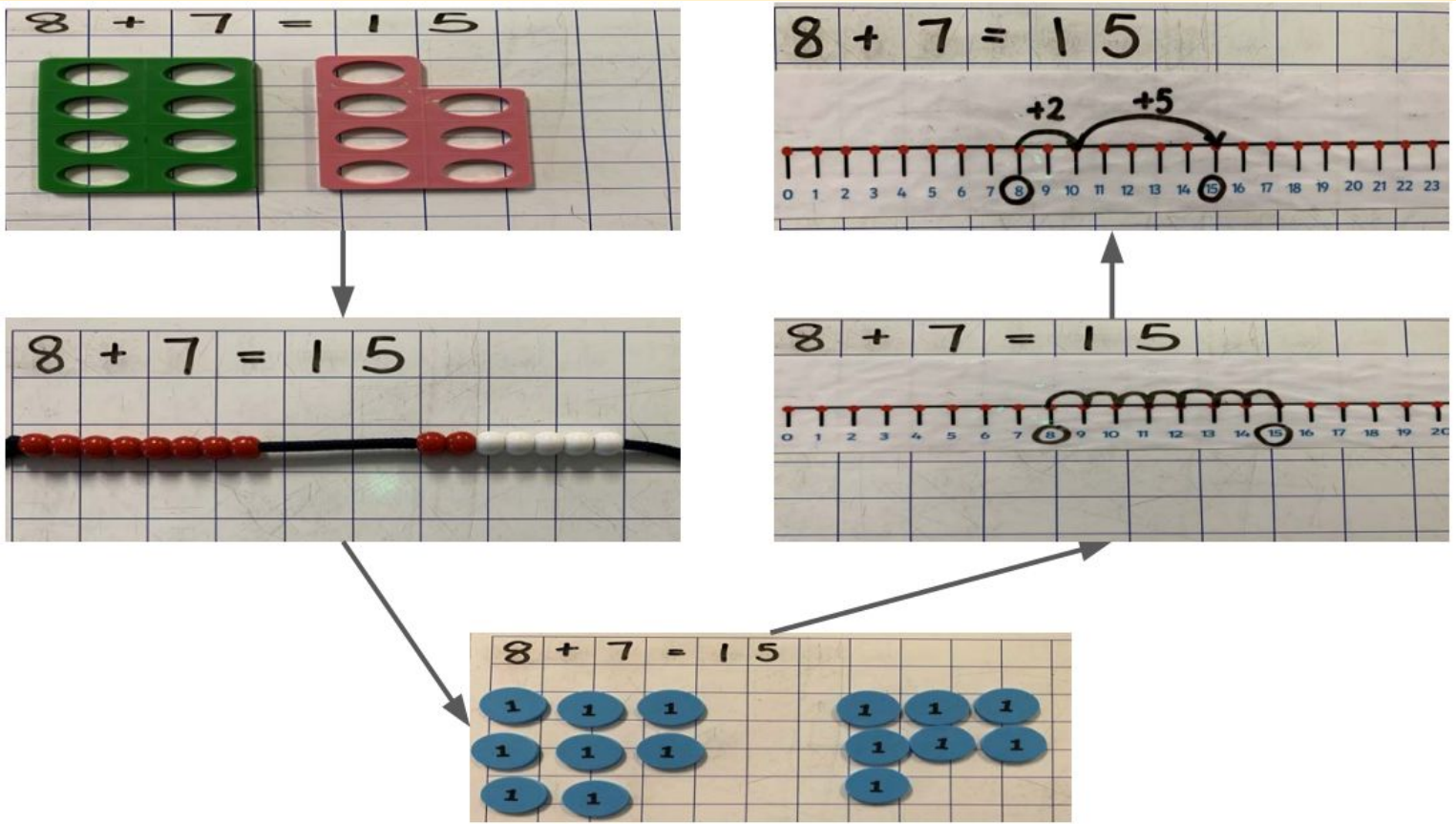
Progression with written methods

Spirit Federation

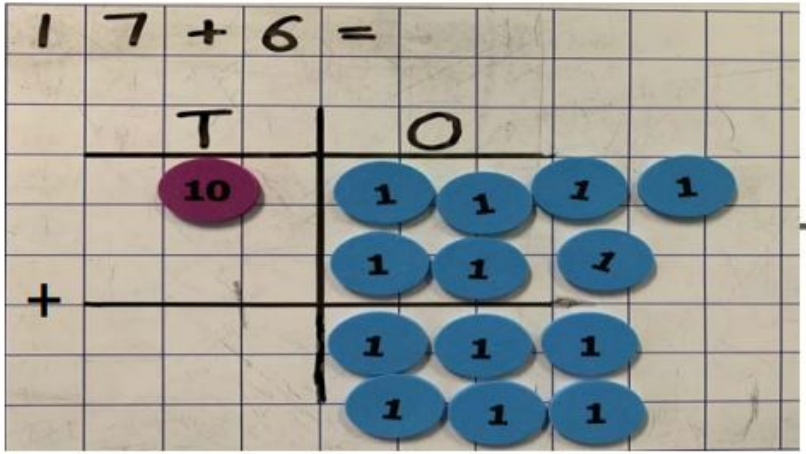
Adding single digit numbers within 10

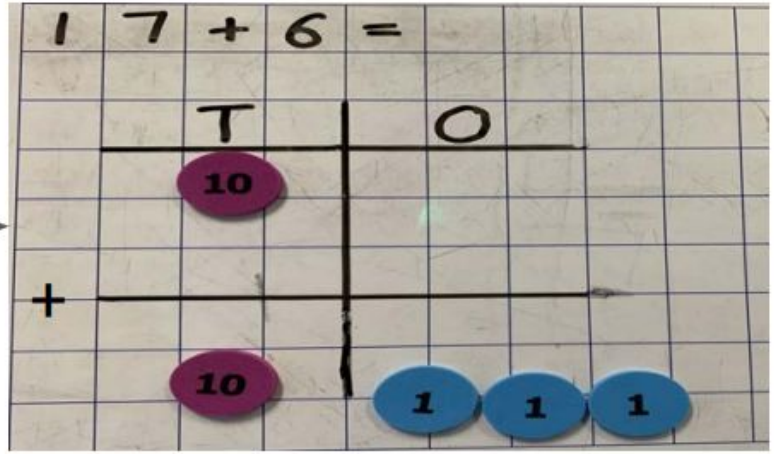


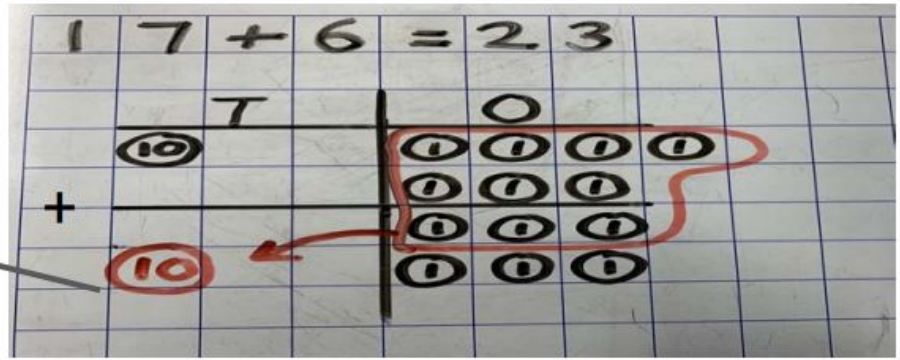
Adding 2 1 digit numbers (bridging 10)



Adding a 1 digit number and 2 digit number (bridging 10)



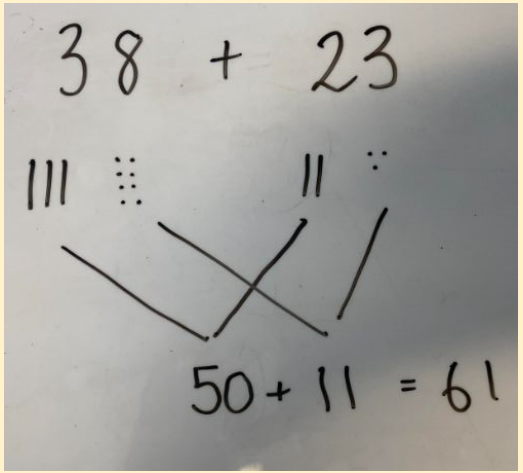


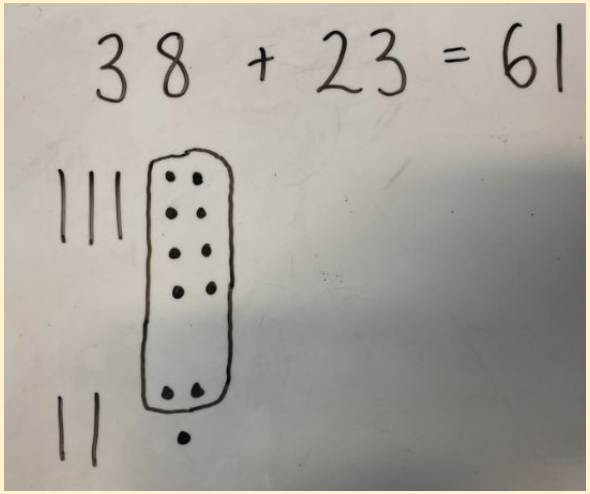


Vocabulary:
Regrouping

Adding 2 digit numbers

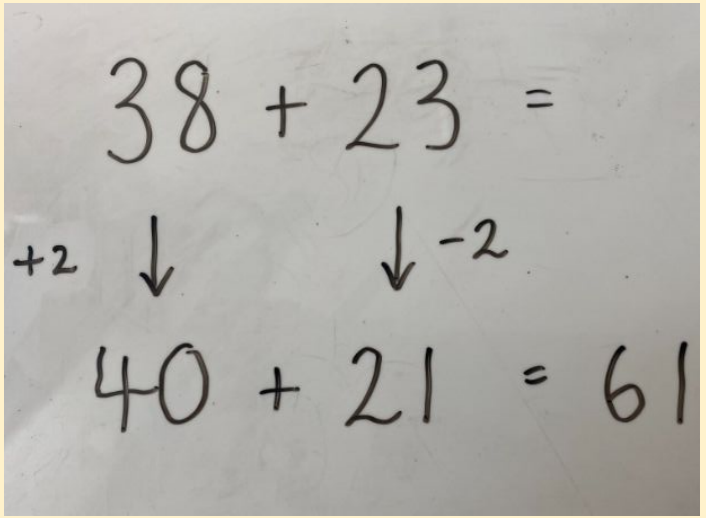
Participating strategy.





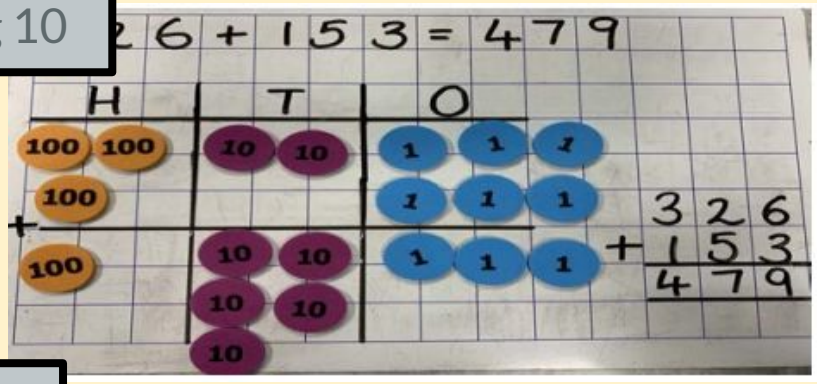
Making 10

Adjusting and compensating.

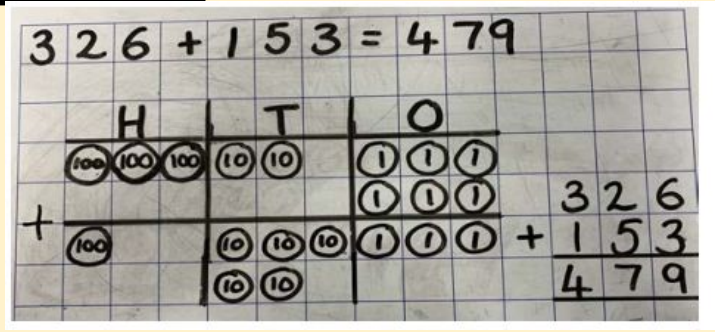


Adding 3 digit numbers

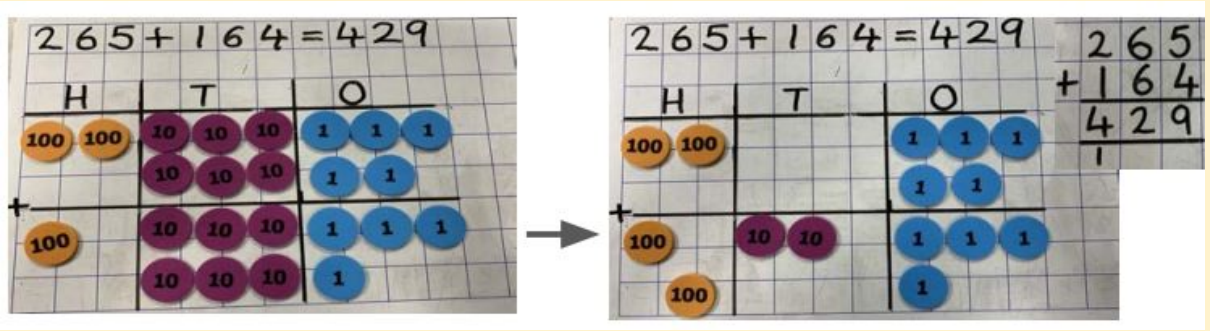
Not bridging 10



In books

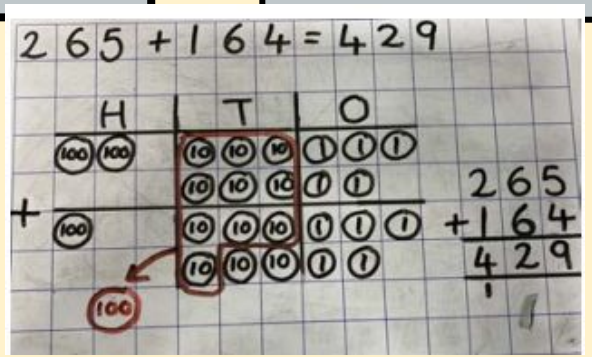


Bridging 10

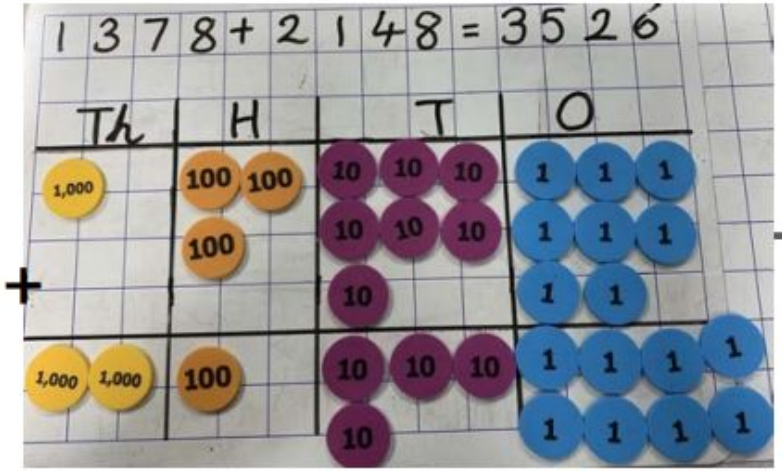


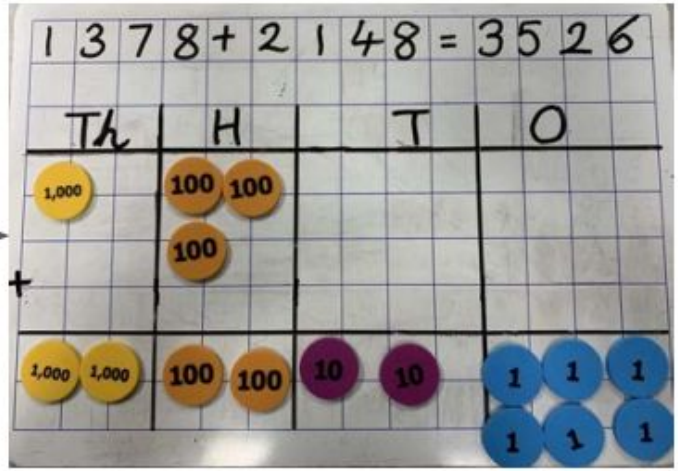
Vocabulary:
Regrouping

In books

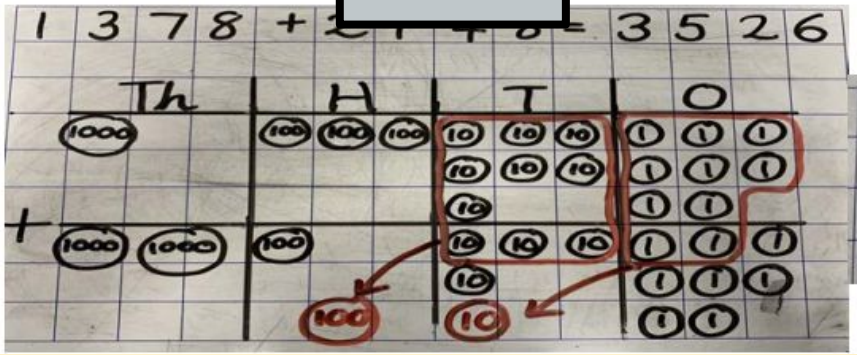


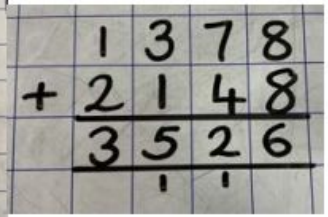
Adding numbers with 4 or more digits (bridging 10s)



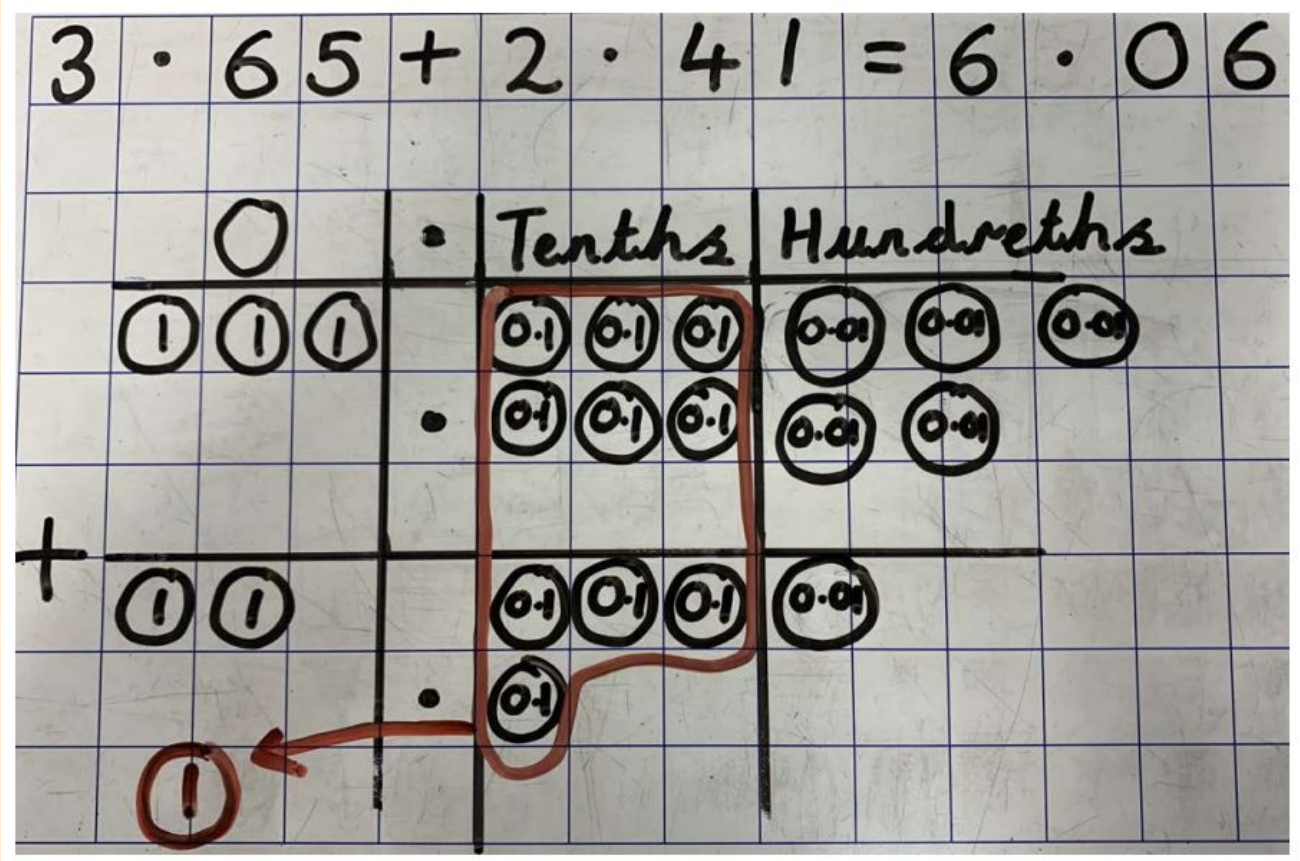


In books





Adding decimals

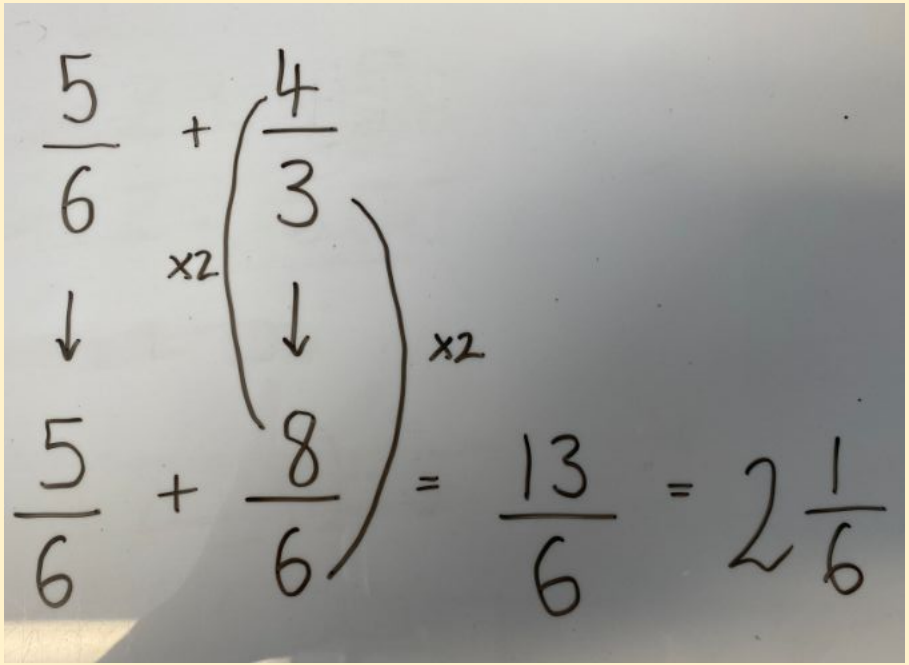


Adding fractions

Write the multiples of each denominator.

Use the common denominator in your equivalent fraction.

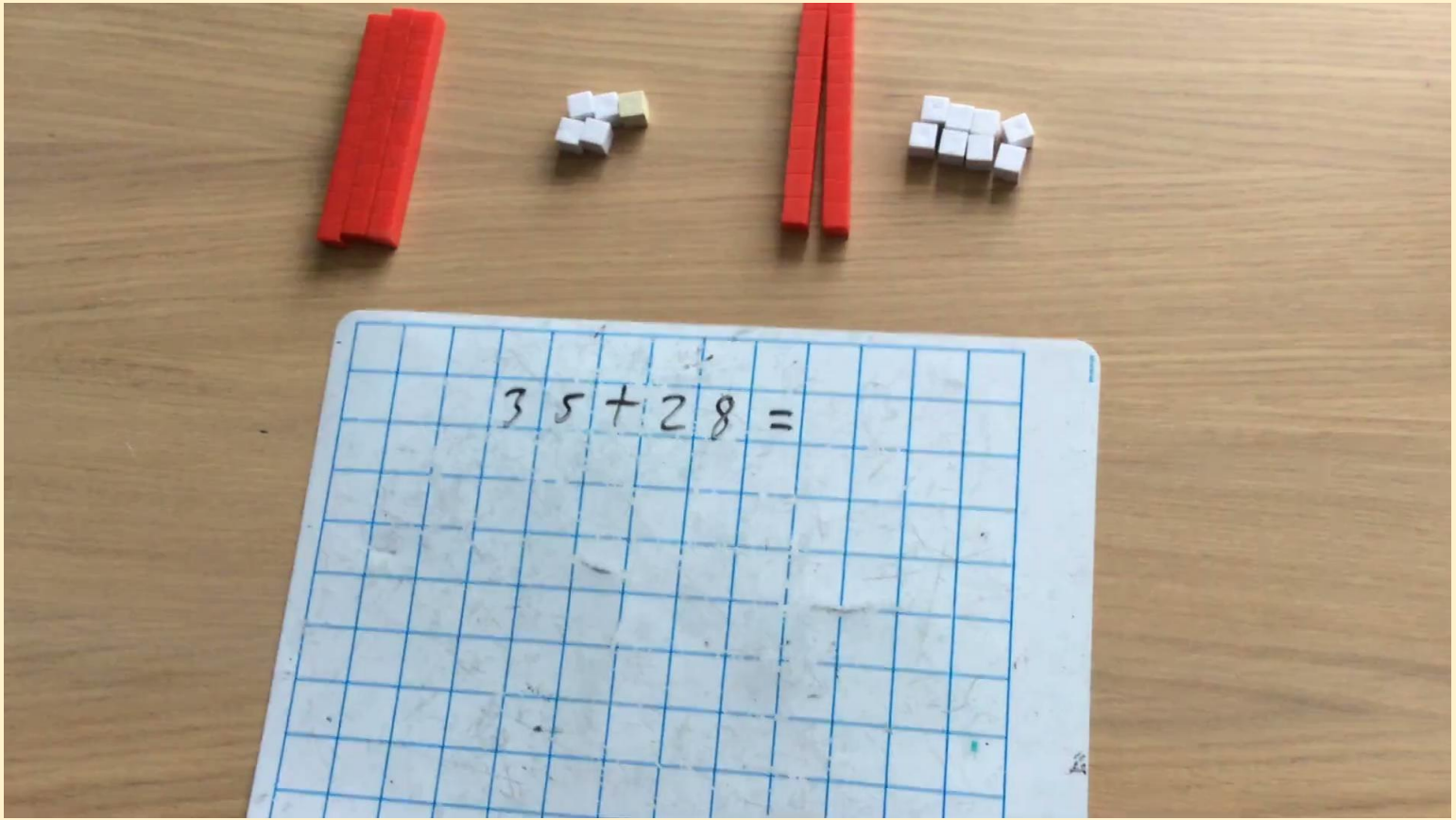
Apply the same operation to the numerator before adding.



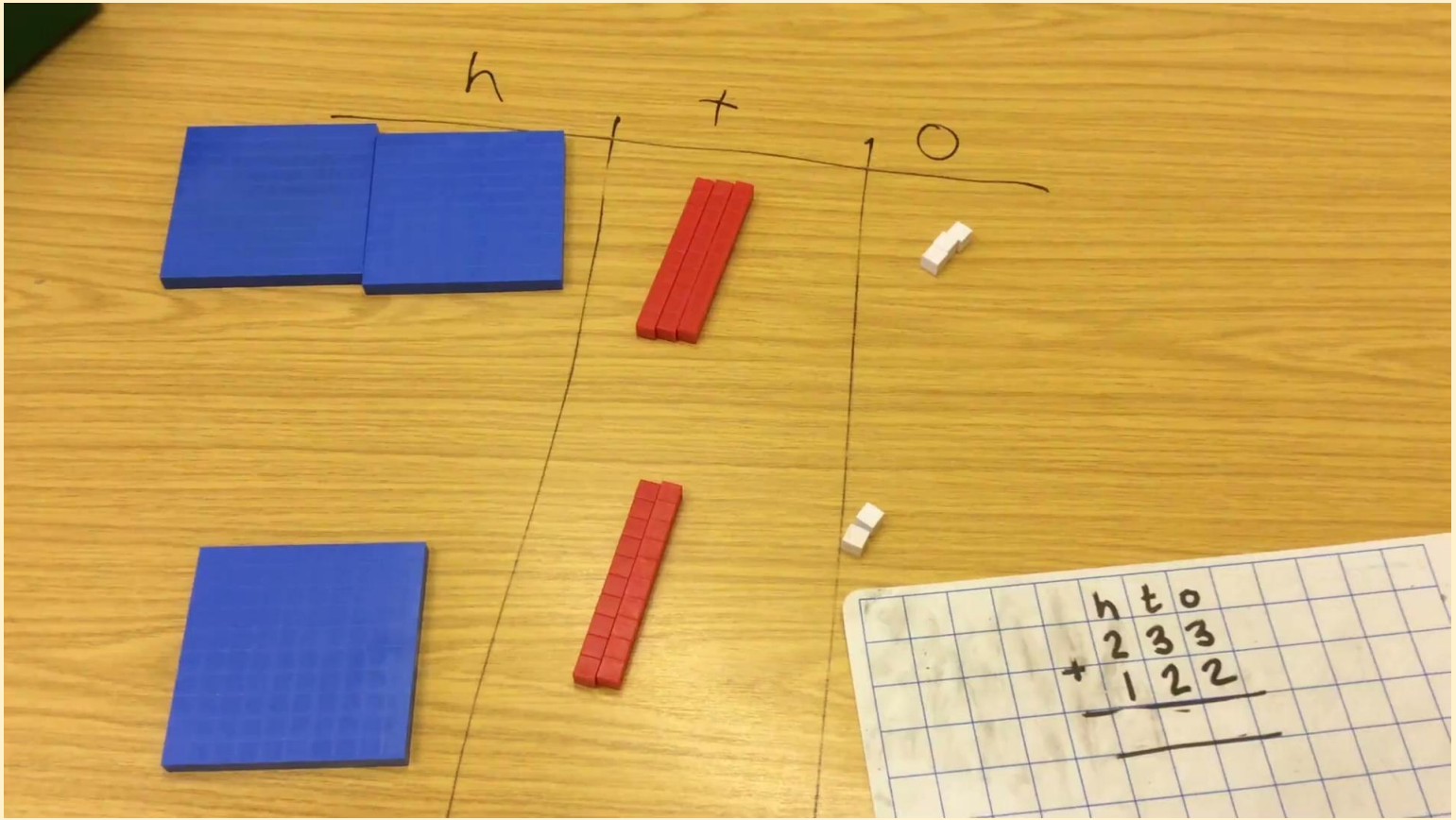
Addition Manipulative videos

Spirit Federation

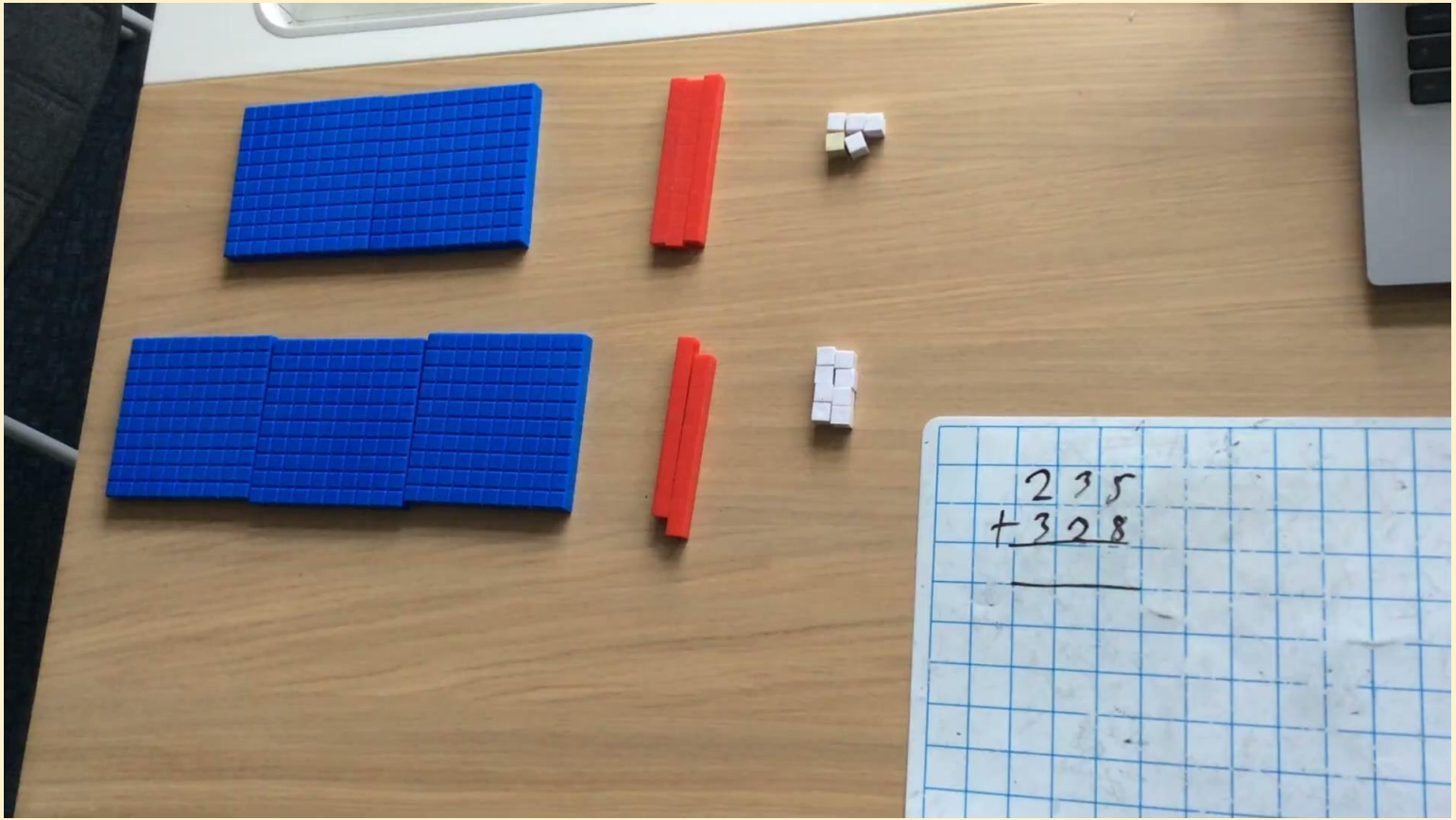
2 digit addition partitioning



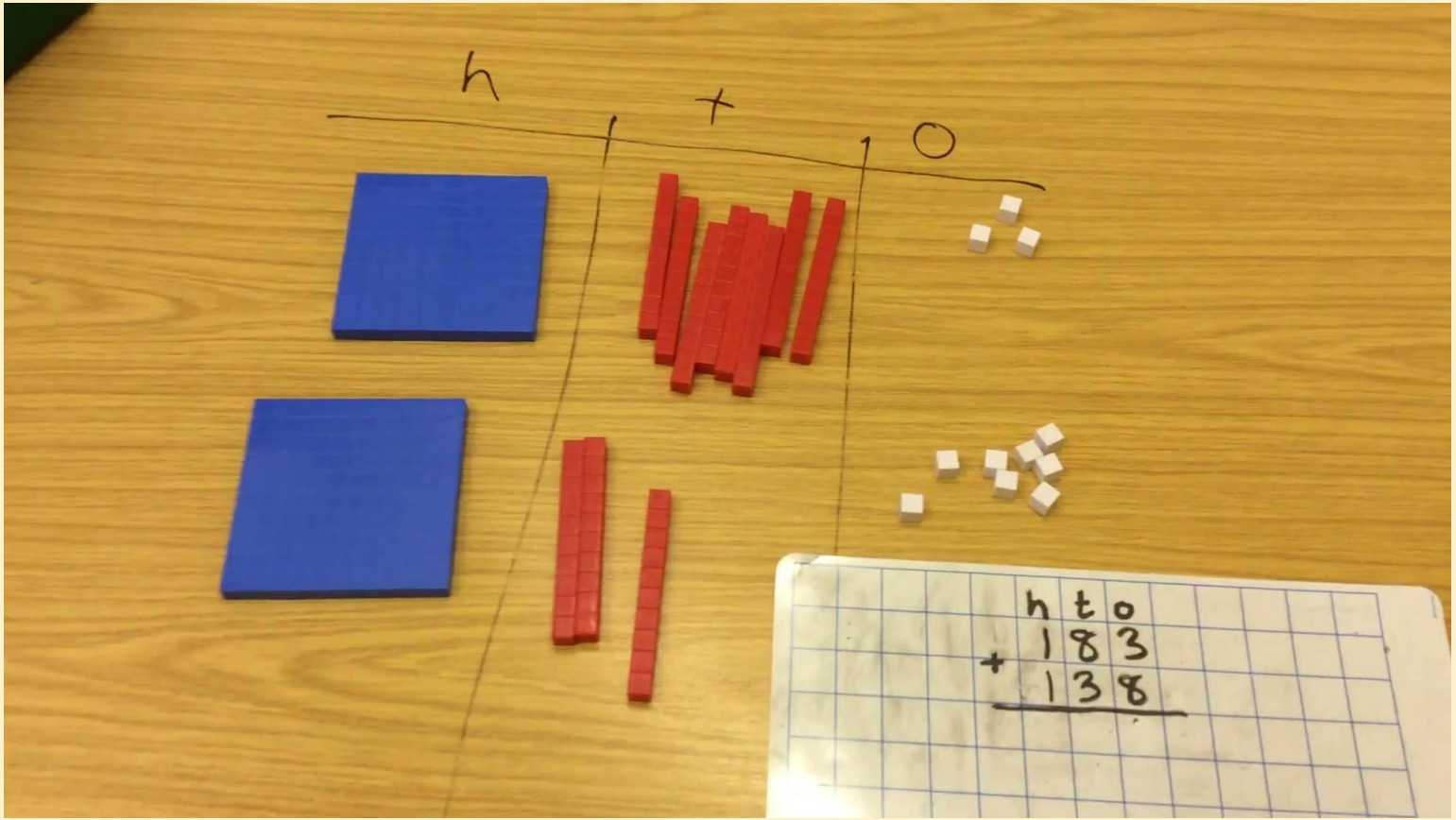
3 digit addition no bridging



3 digit addition bridging ones



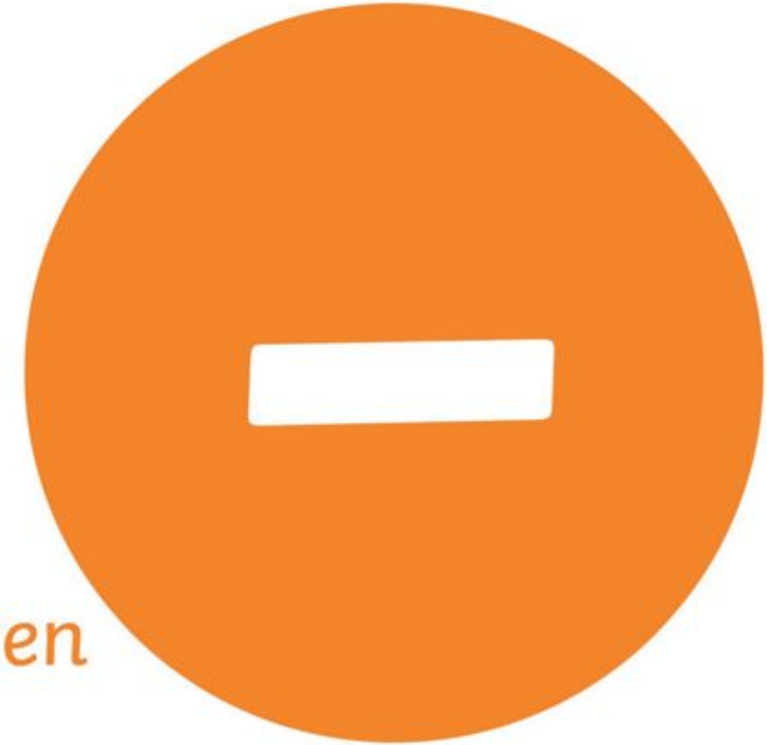
3 digit addition bridging ones and tens

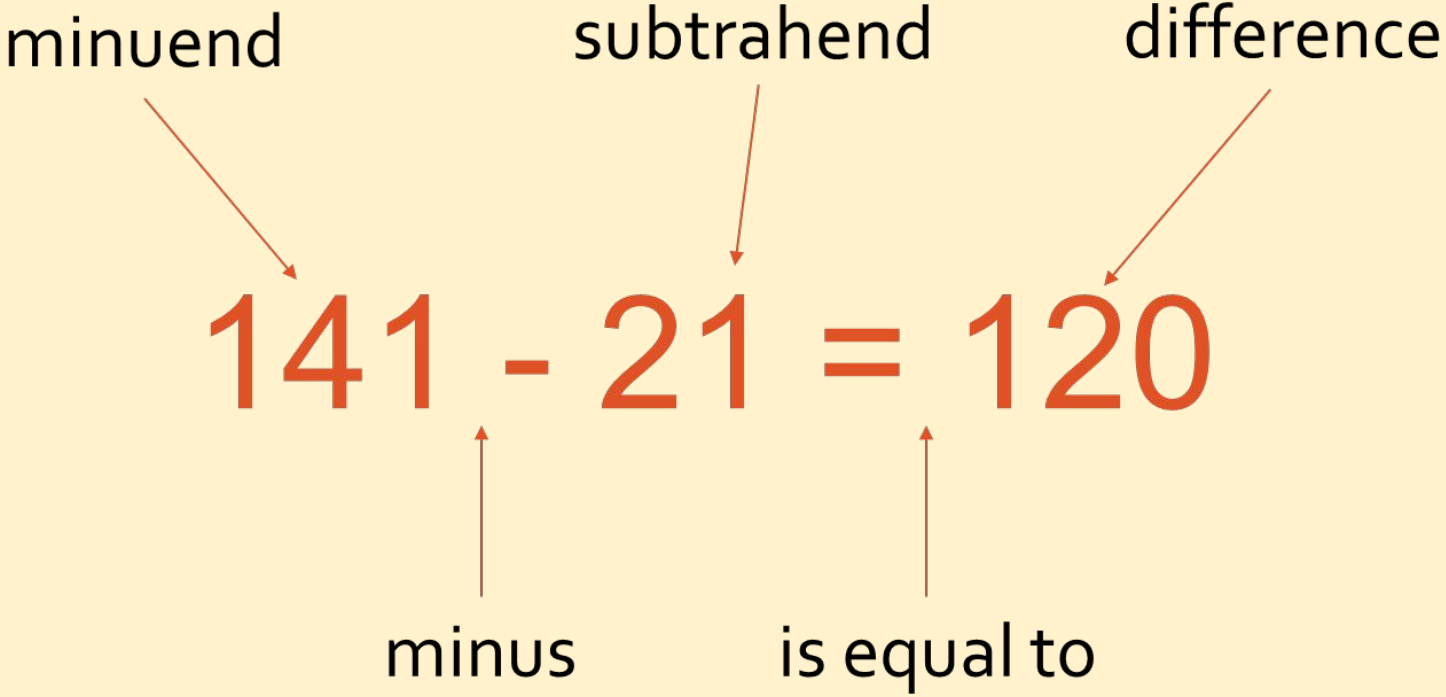


Subtraction

Spirit Federation

- subtract
- minus
- leave
- less
- take away
- difference between




minuend
subtrahend
difference
141 - 21 = 120
minus
is equal to

Fundamental Structures

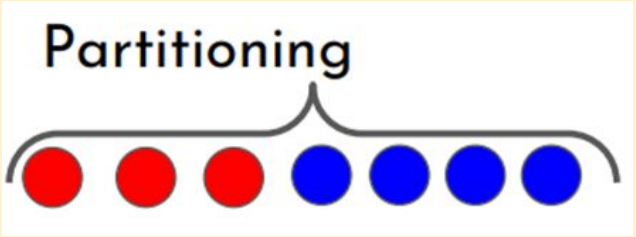
Spirit Federation

Partitioning

Spirit Federation

Key Stage 1

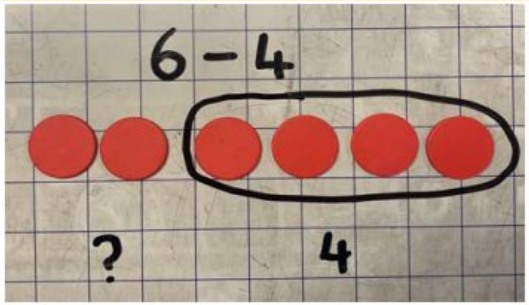
Keywords Take away how many left given sold

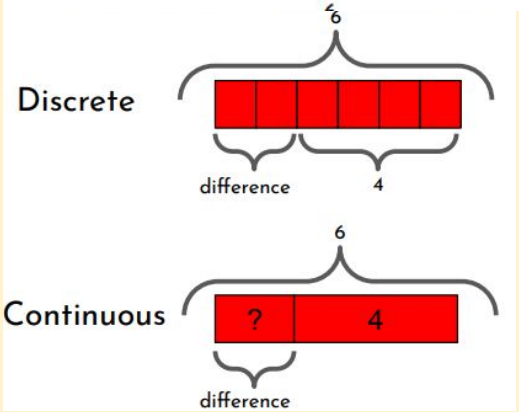


Word problem

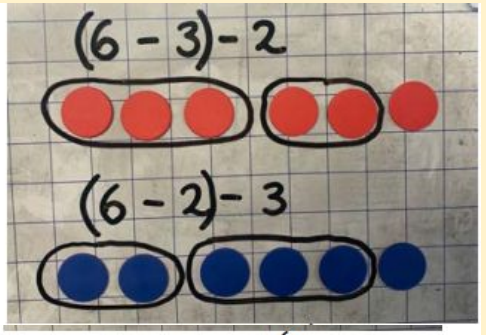
Benny has 6 toy giraffes. He took 4 with him on holiday.

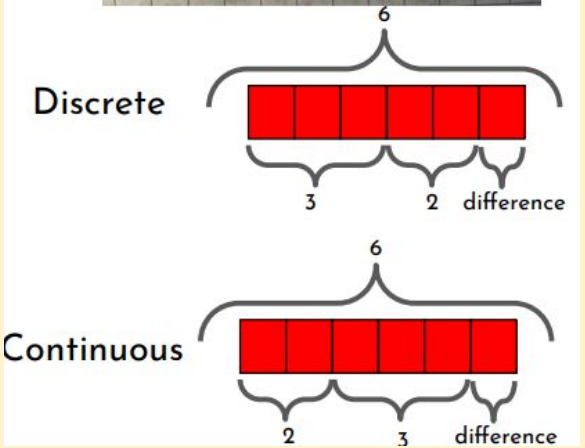
How many were left behind?





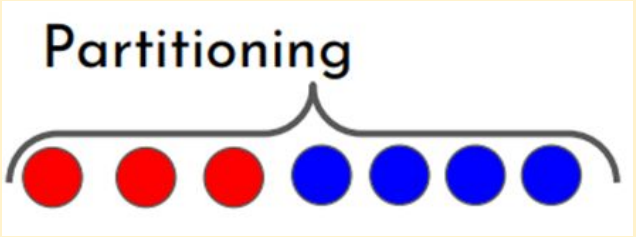
Commutativity (only with subtrahends)





Key Stage 2

Keywords Take away how many left given sold



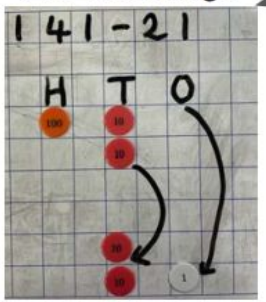
Word problem

Chen has collected 256 stamps but in order to organise her collection, she needs to file 134 of them away.

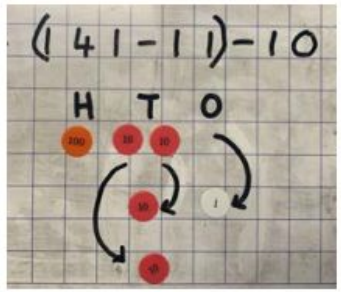
How many stamps does she have loose now?

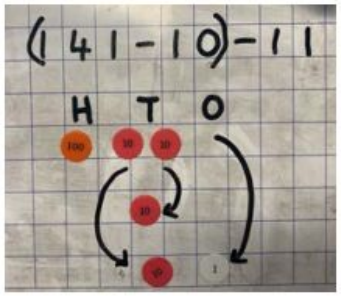
Partitioning

No exchange

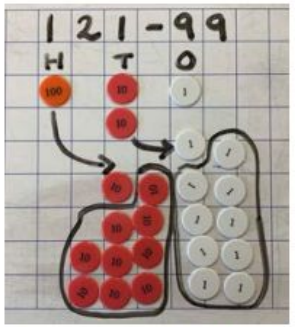


Commutativity
(only with subtrahends)

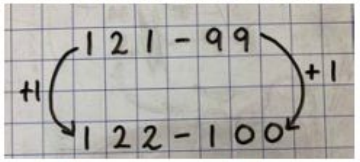




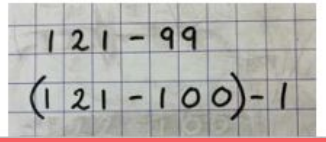
With exchange



Constant difference



Compensation

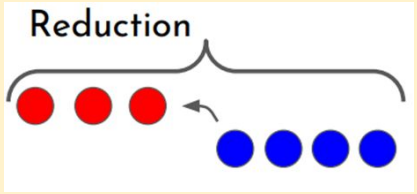


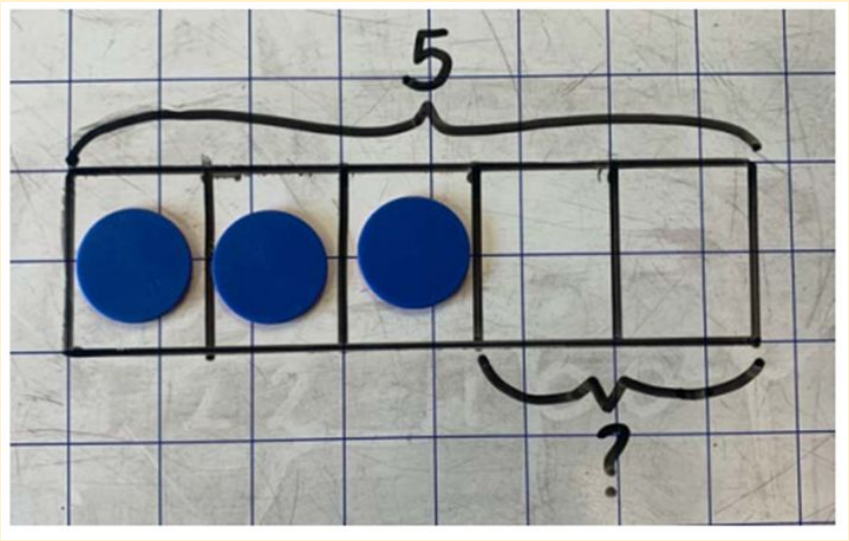
Reduction

Spirit Federation

Key Stage 1

Keywords Reduced left Decreased Given away Lost Eaten





Word problem

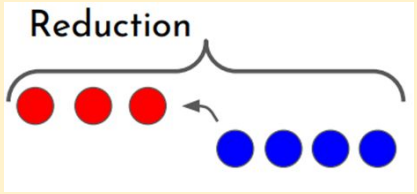
Trudy is holding 5 lollisticks but decides to throw 2 of them away.

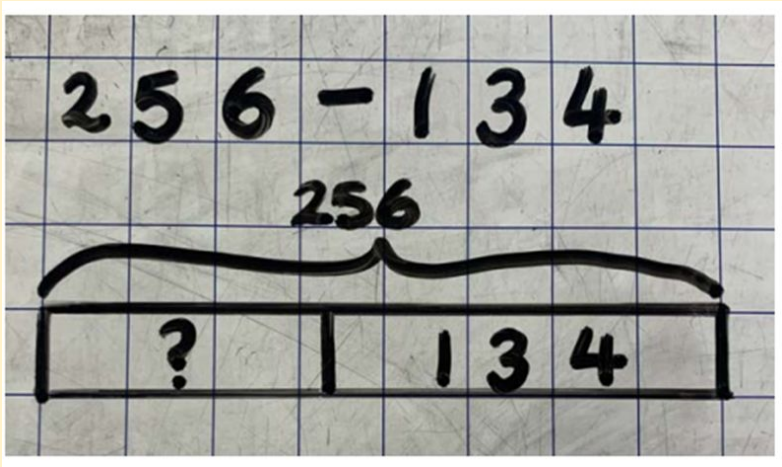
How many does she have left?



Key Stage 2

Keywords Reduced left Decreased Given away Lost Eaten

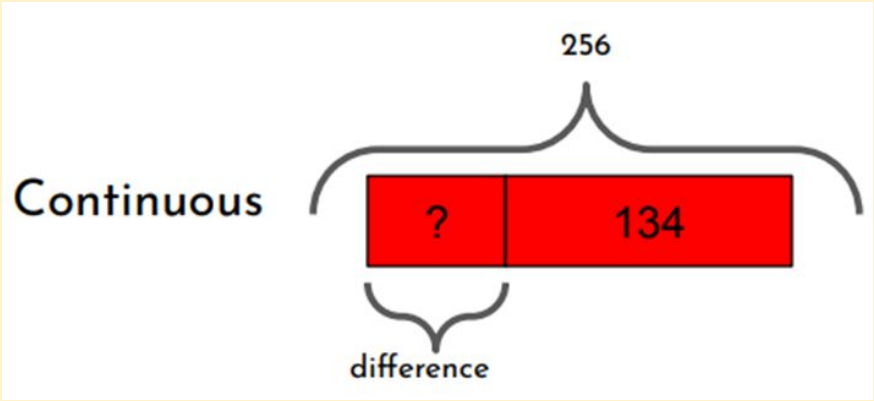




Word problem

Chen has collected 256 stamps but in order to organise her collection, she needs to file 134 of them away.

How many stamps does she have loose now?



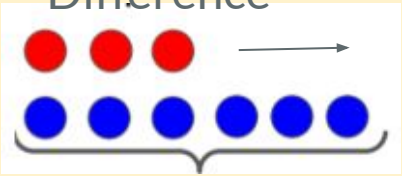
Difference

Spirit Federation

Key Stage 1

Keywords Difference How many more How many less

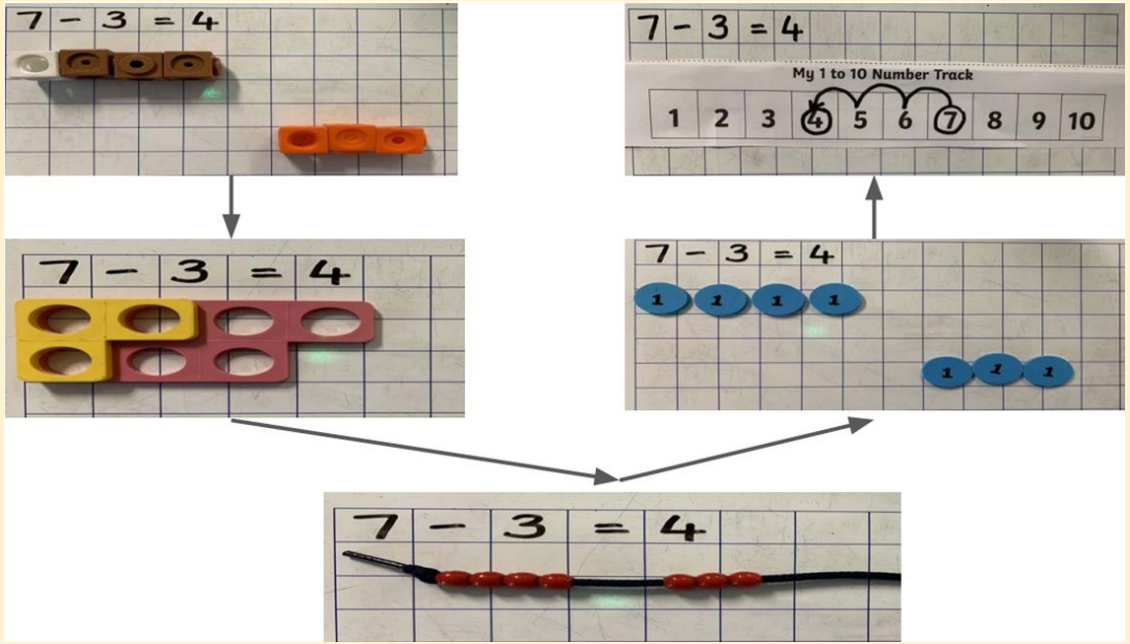
Difference



Word problem

Carl has 8 collector cards and James has 12

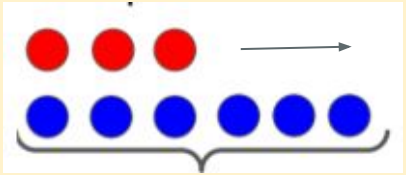
How many more cards does James have?



Key Stage 2

Keywords Difference How many more How many less

Difference



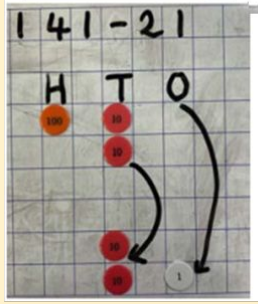
Word problem

Carl has 234 collector cards and James has 451

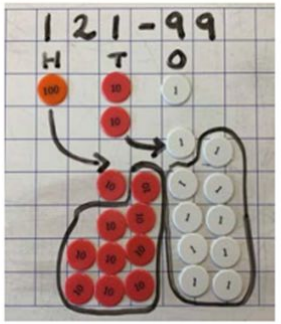
How many more cards does James have?

Partitioning

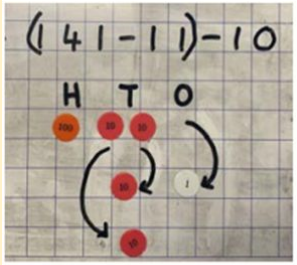
No exchange

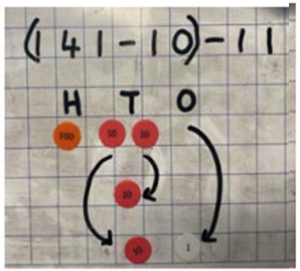


With exchange

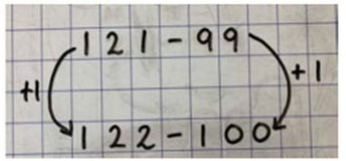


Commutativity (only with subtrahends)

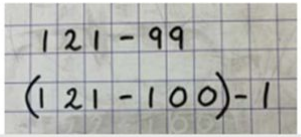




Constant difference



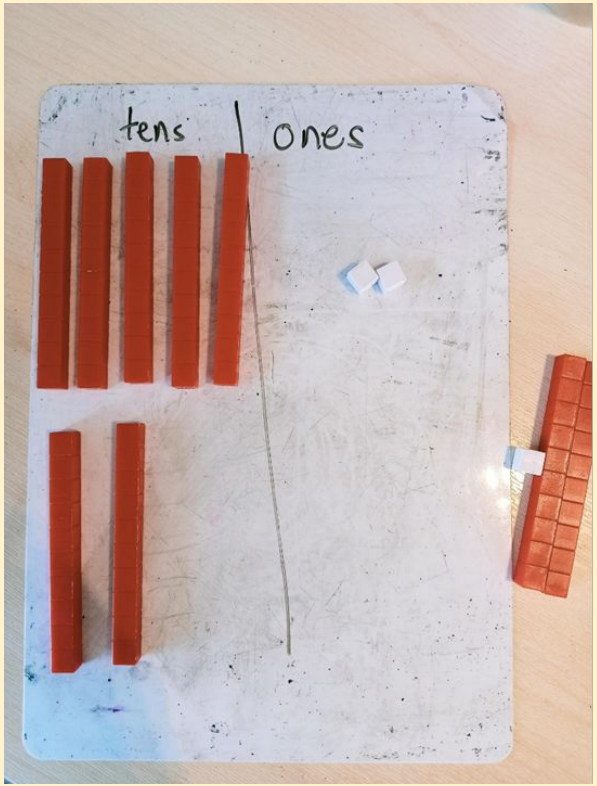
Compensation

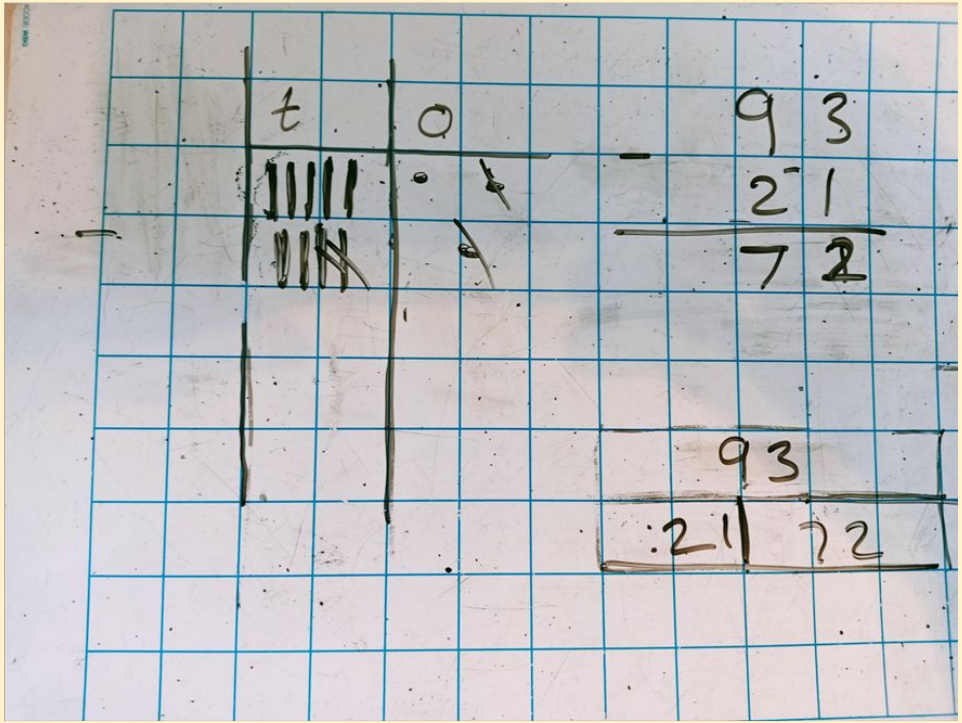


Manipulatives

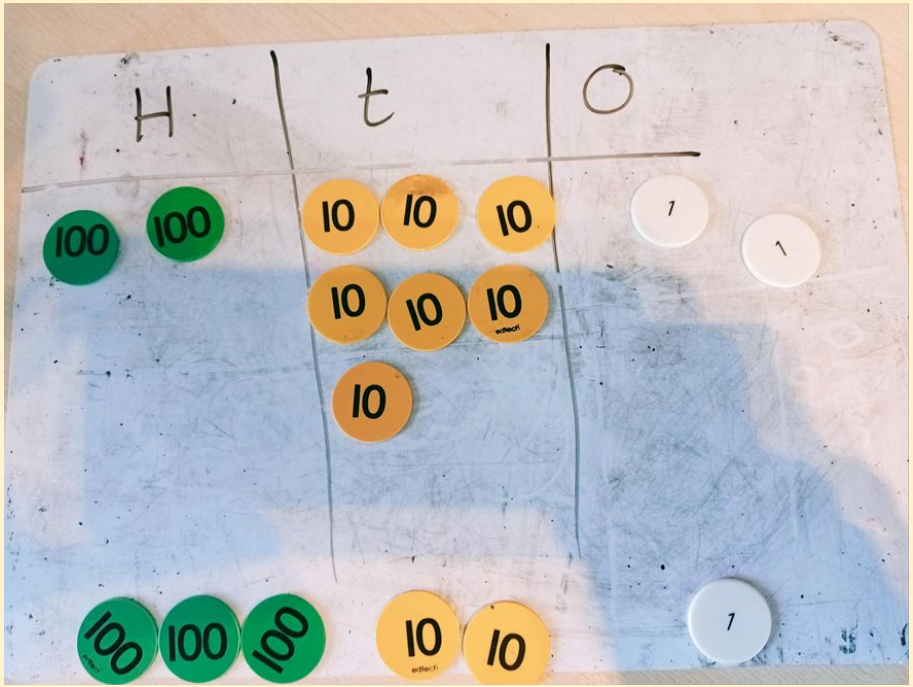
Spirit Federation

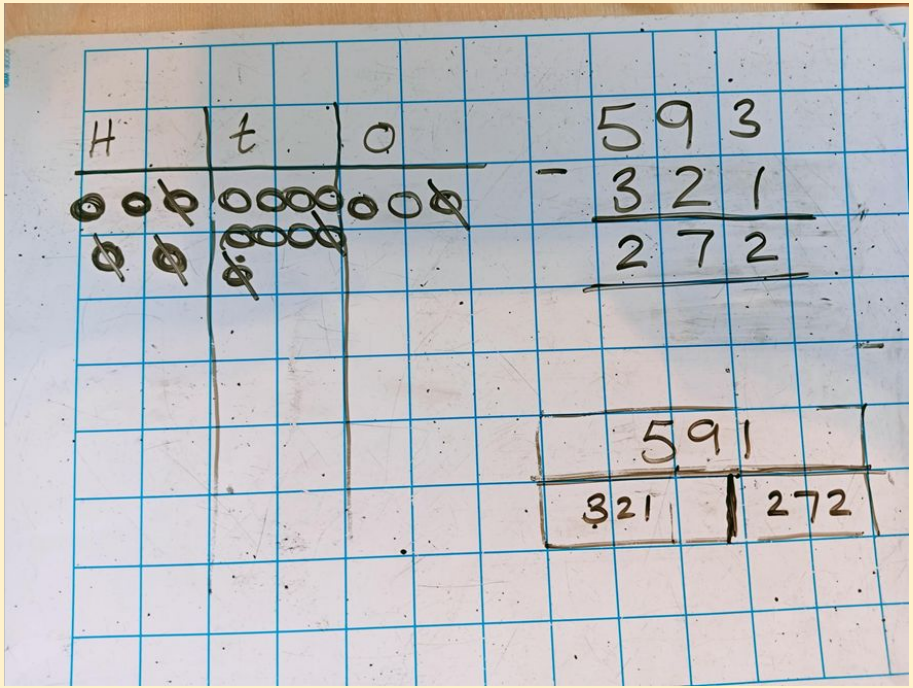
Key Stage 1 Manipulatives





Key Stage 2 Manipulatives

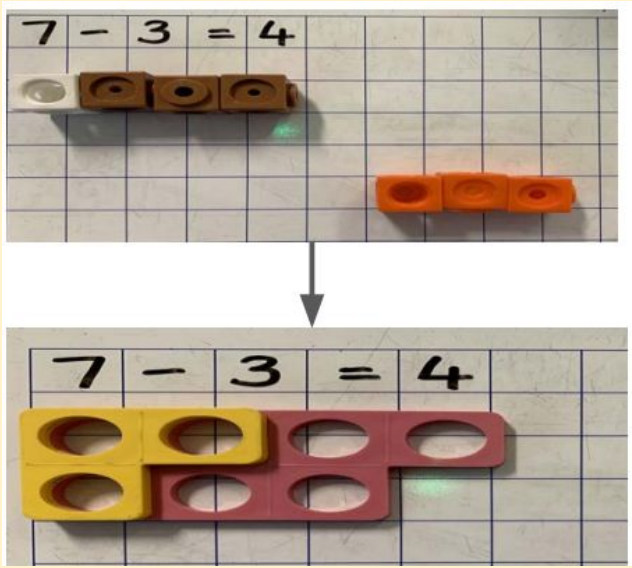


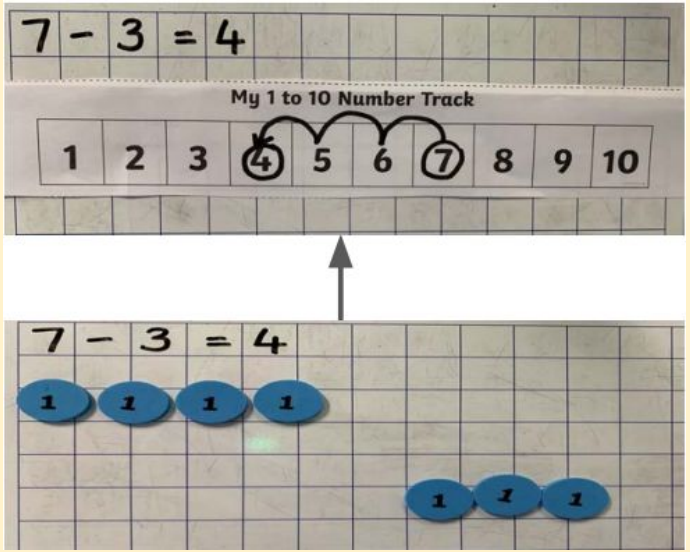


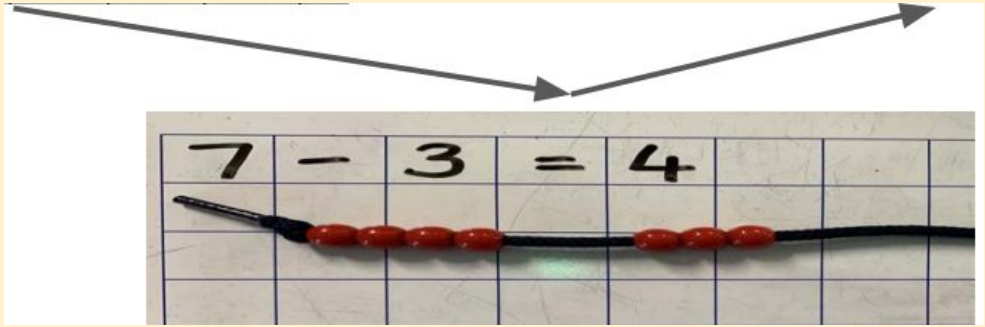
Progression of written methods

Spirit Federation

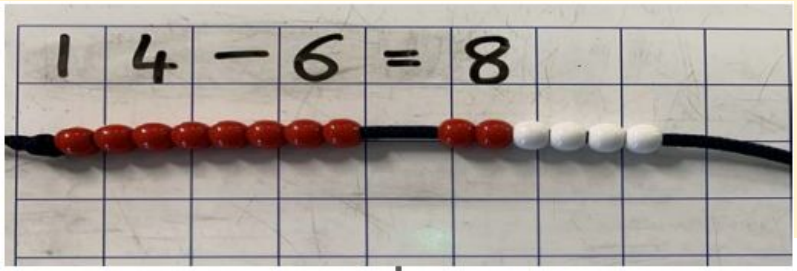
Subtracting single digit numbers within 10

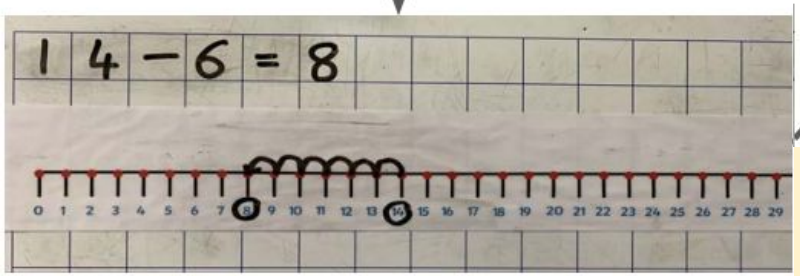


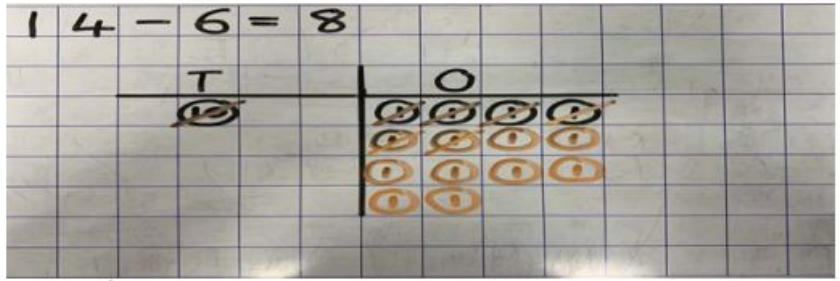




Subtracting a 1 digit number from a 2 digit number (bridging 10)

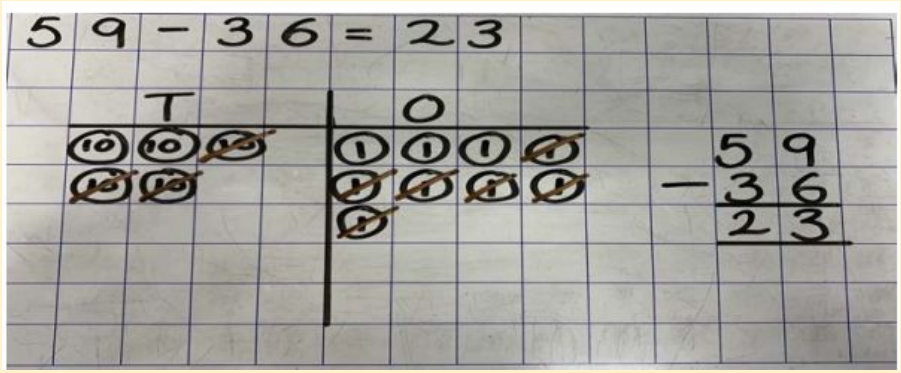




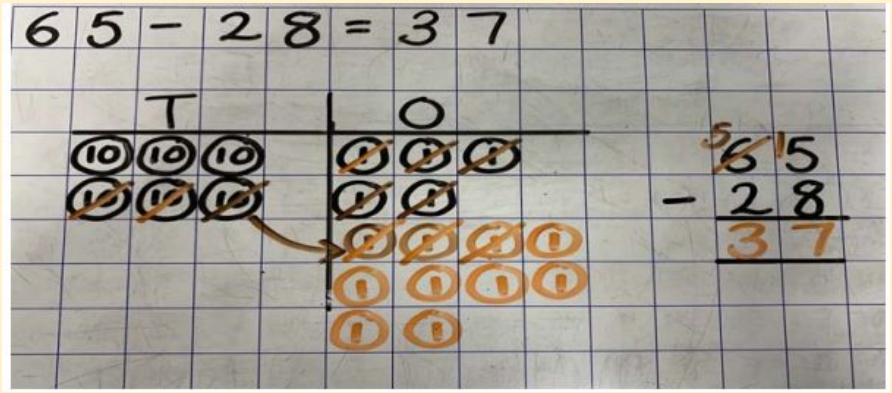


Subtracting 2 digit numbers

Not bridging 10



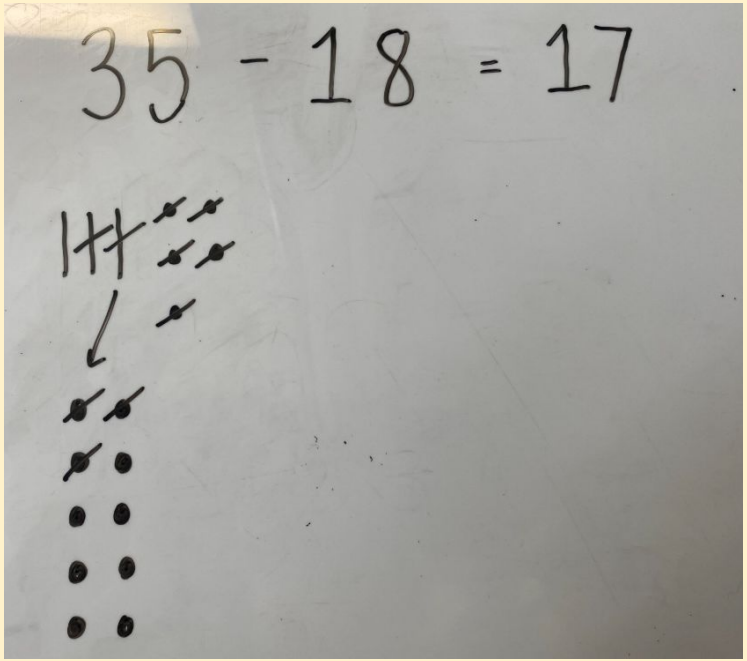
Bridging 10



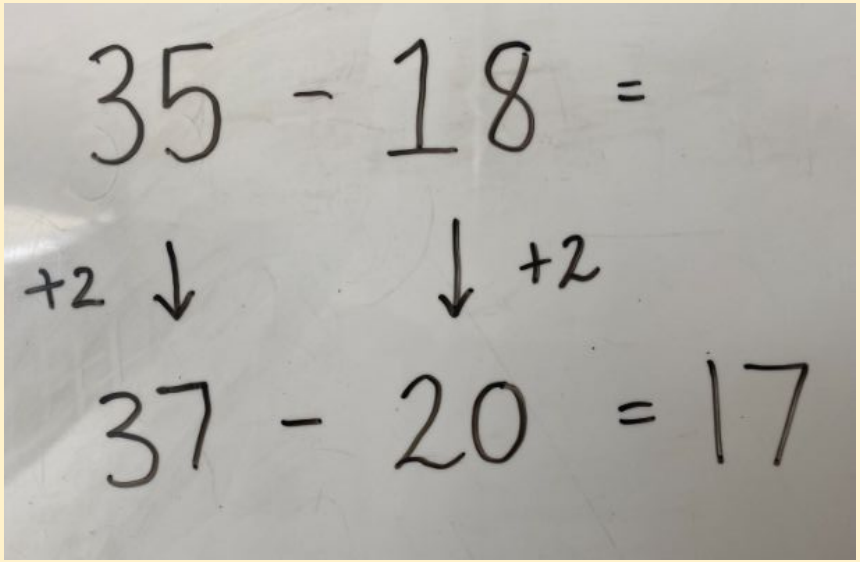
Vocabulary:
Exchanging

Subtracting 2 digit numbers

Exchanging or regrouping.

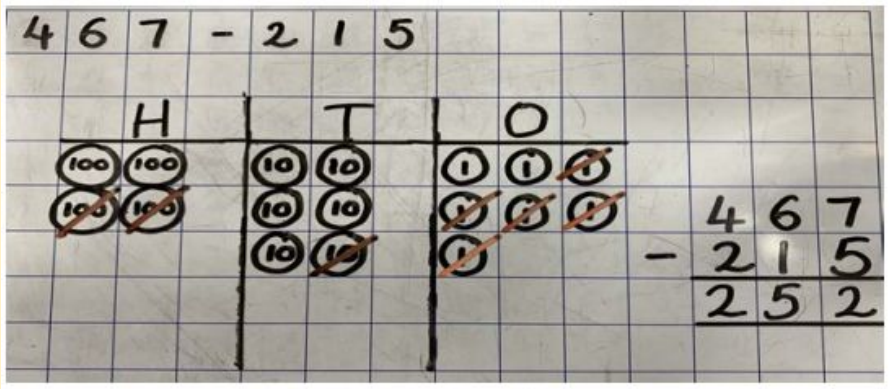


Same difference.

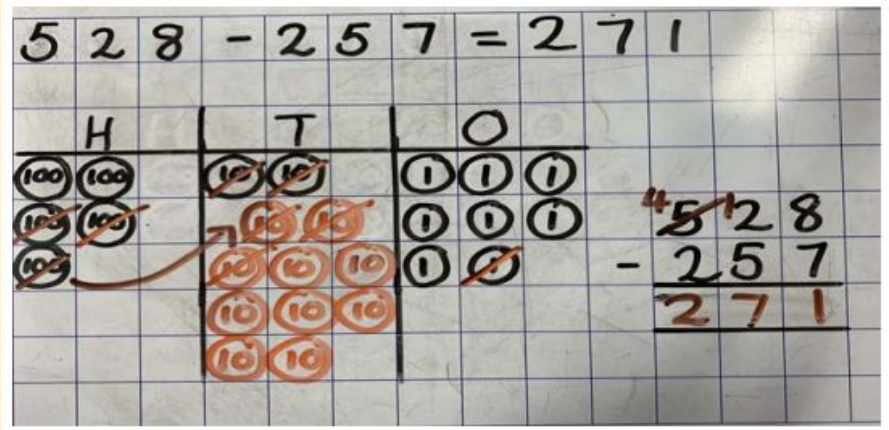


Subtracting 3 digit numbers

Not bridging 10

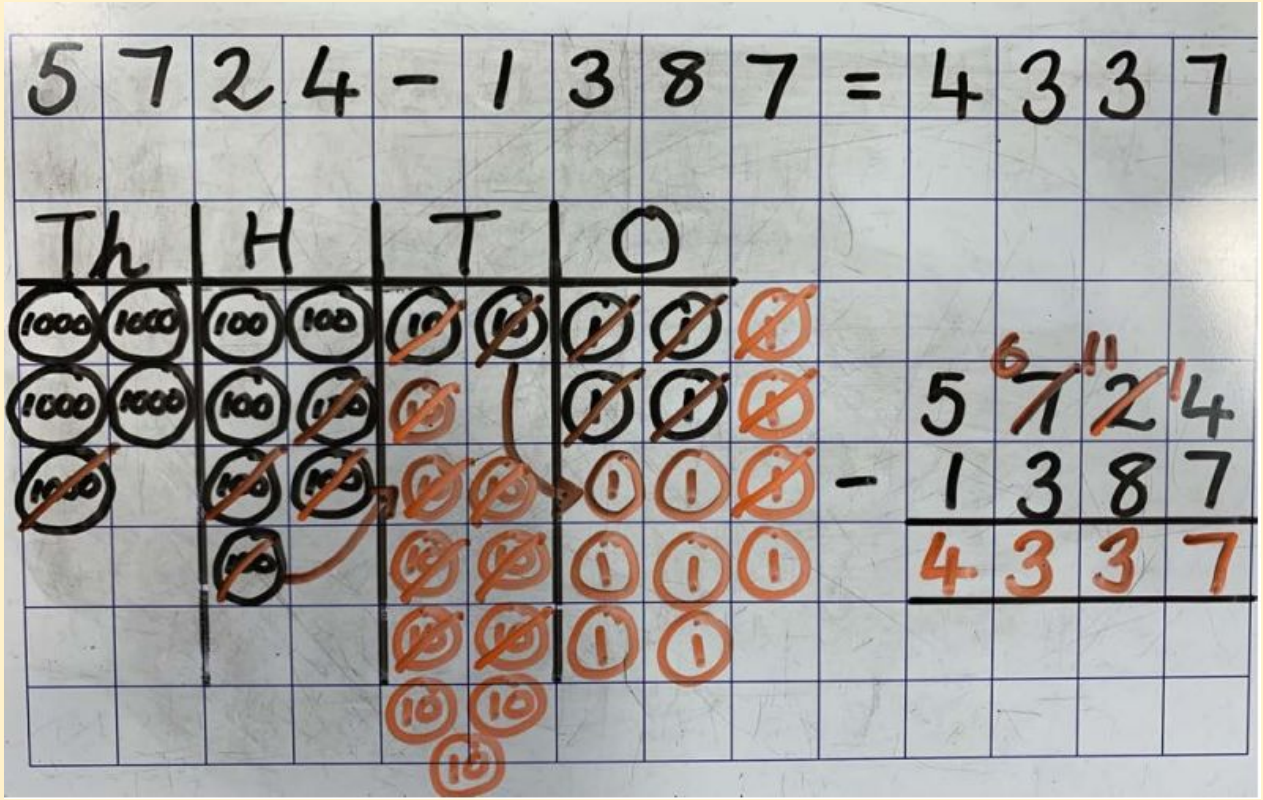


Bridging 10



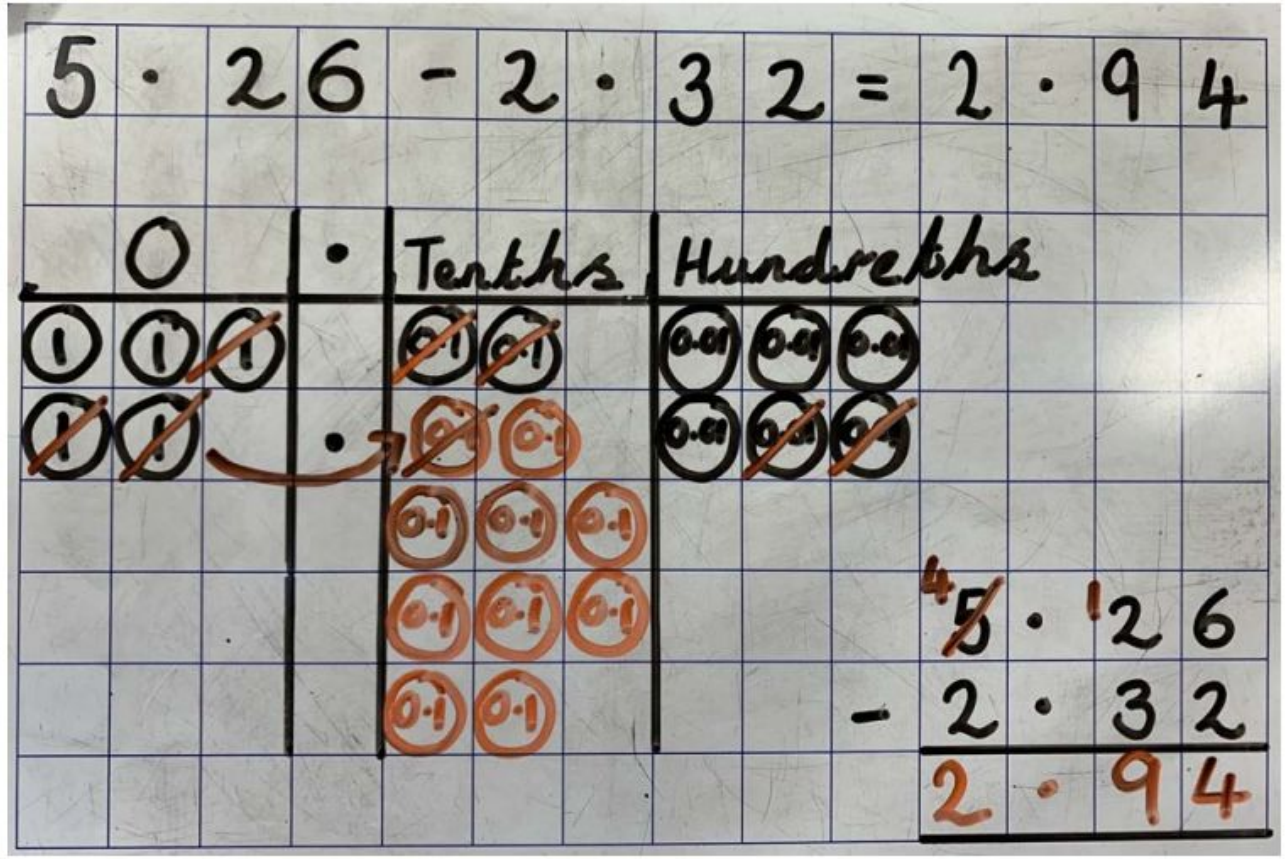
Vocabulary:
Exchanging

Subtracting 4 digit numbers



Vocabulary:
Exchanging

Subtracting decimals



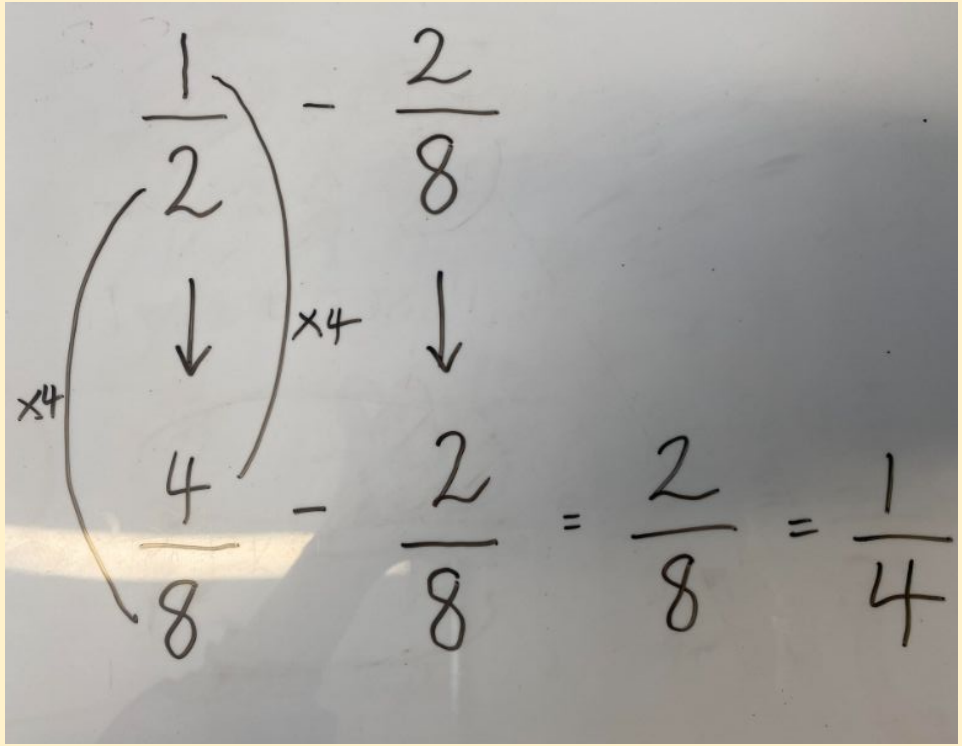
Vocabulary:
Exchanging

Subtracting fractions

Write the multiples of each denominator.

Use the common denominator in your equivalent fraction.

Apply the same operation to the numerator before subtracting.



Subtraction Manipulative videos

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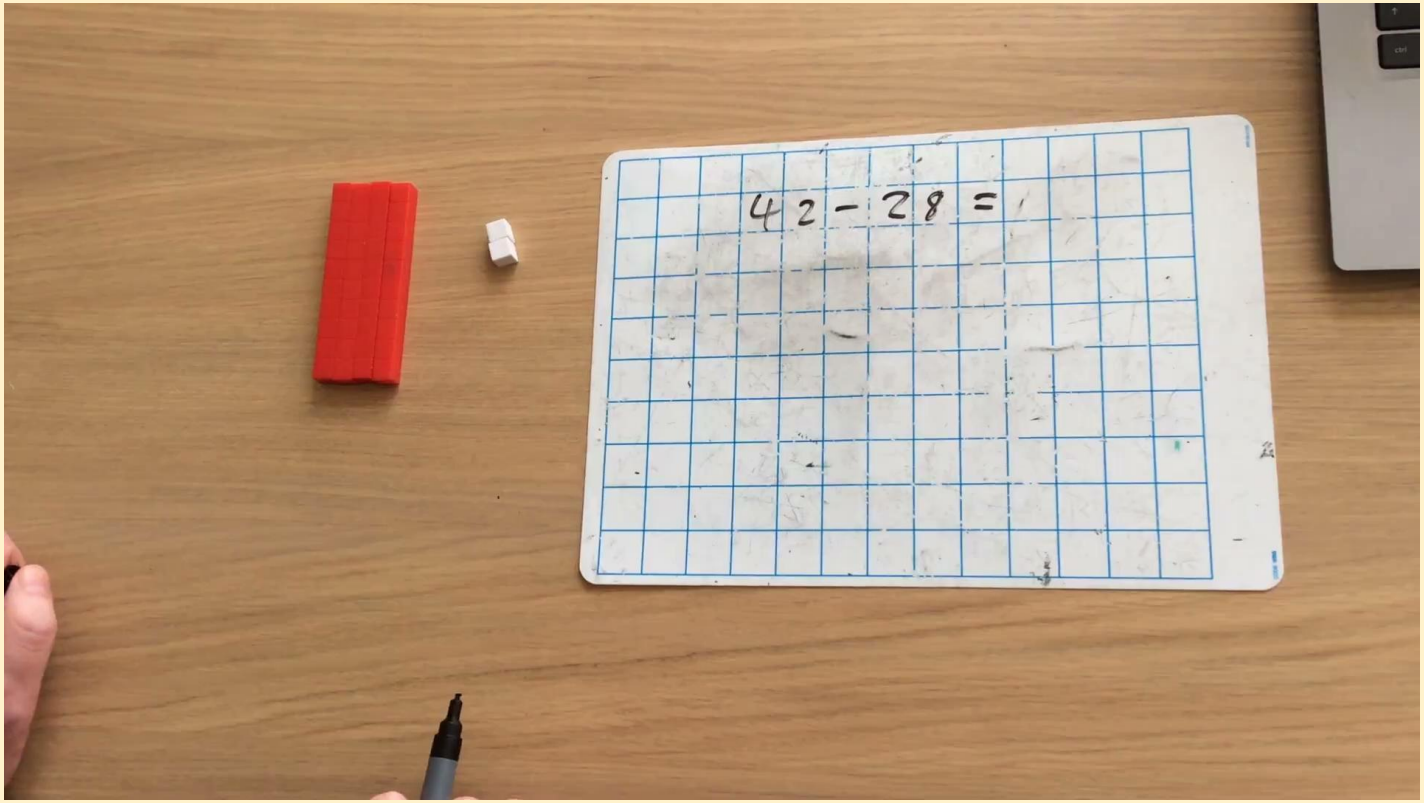
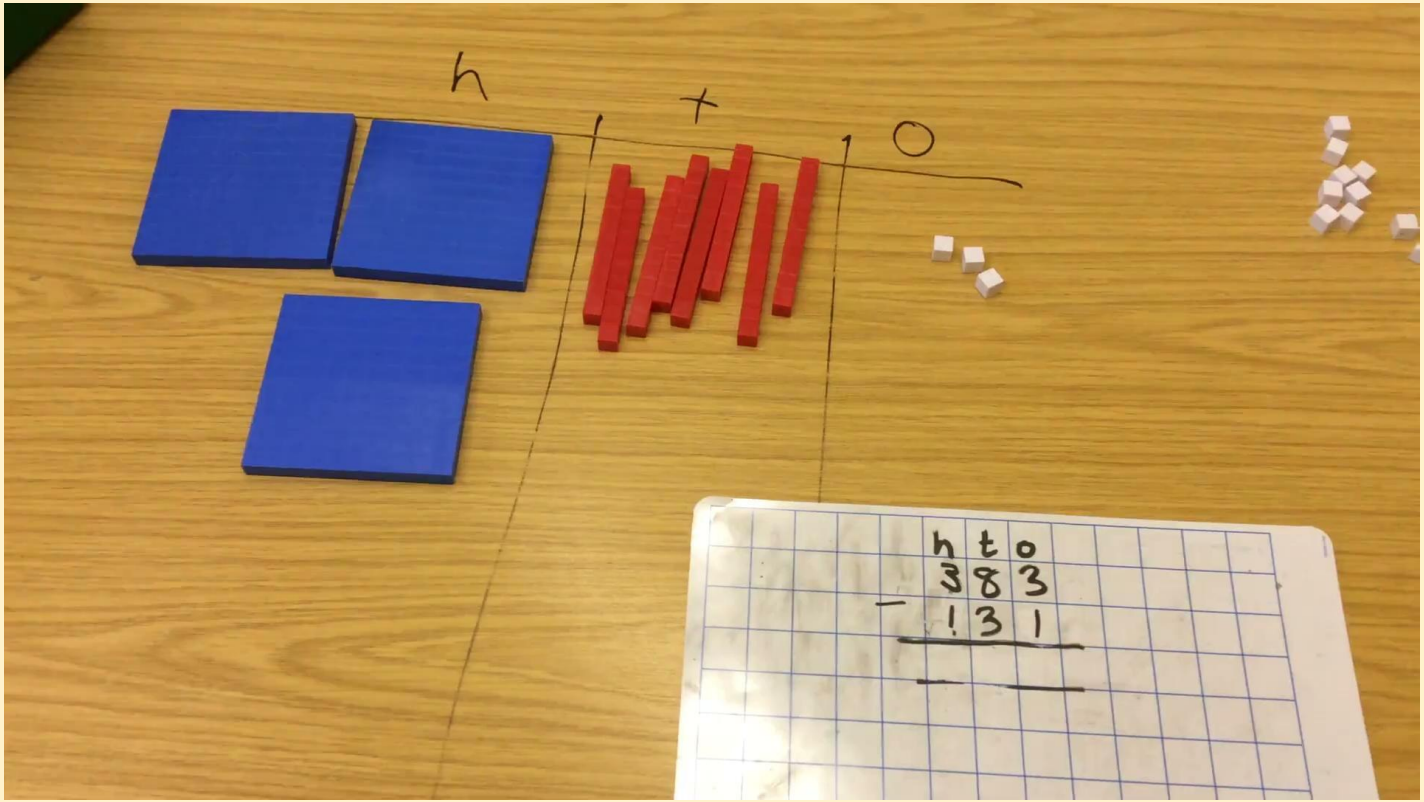
2 digit subtraction 1 exchange



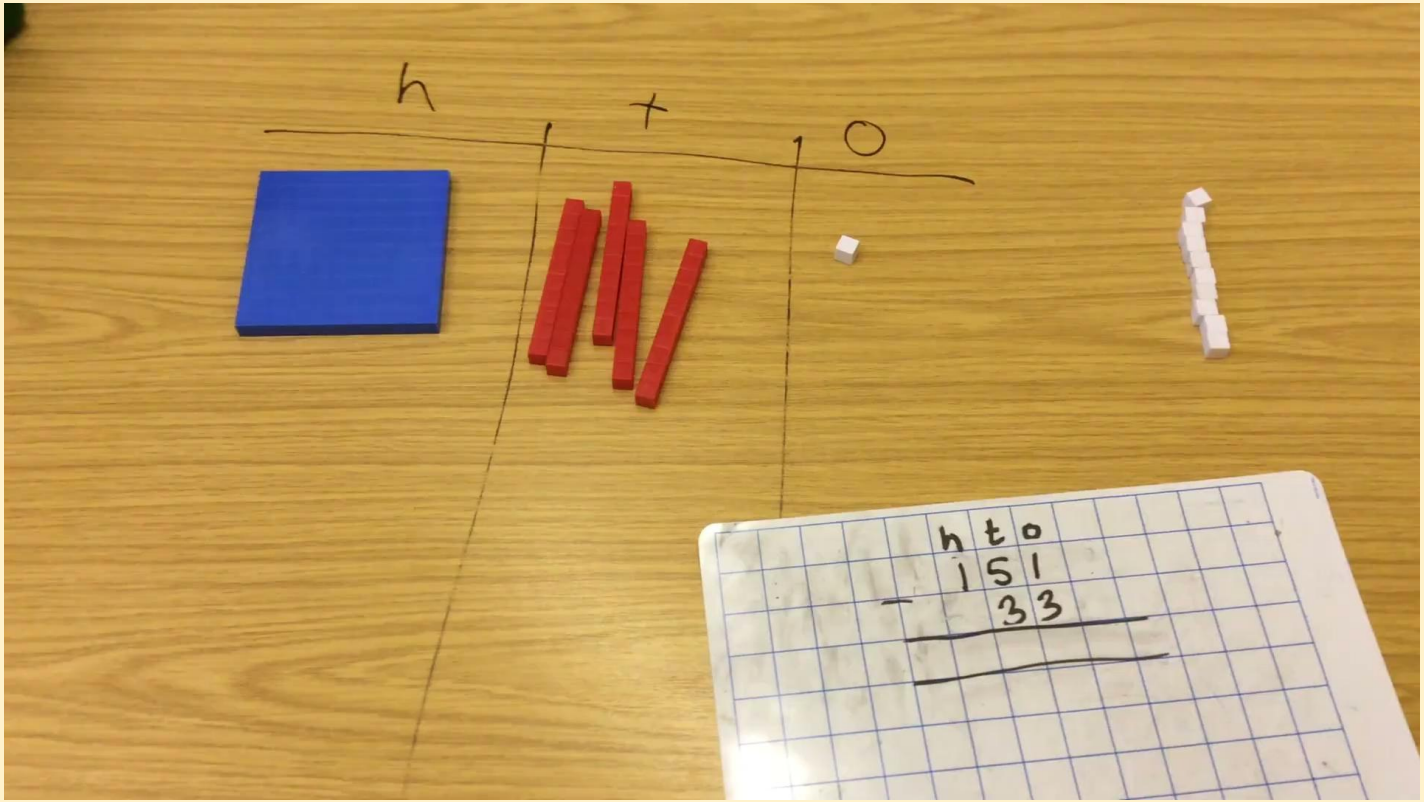
Vocabulary:
Exchanging

3 digit subtraction no exchanging



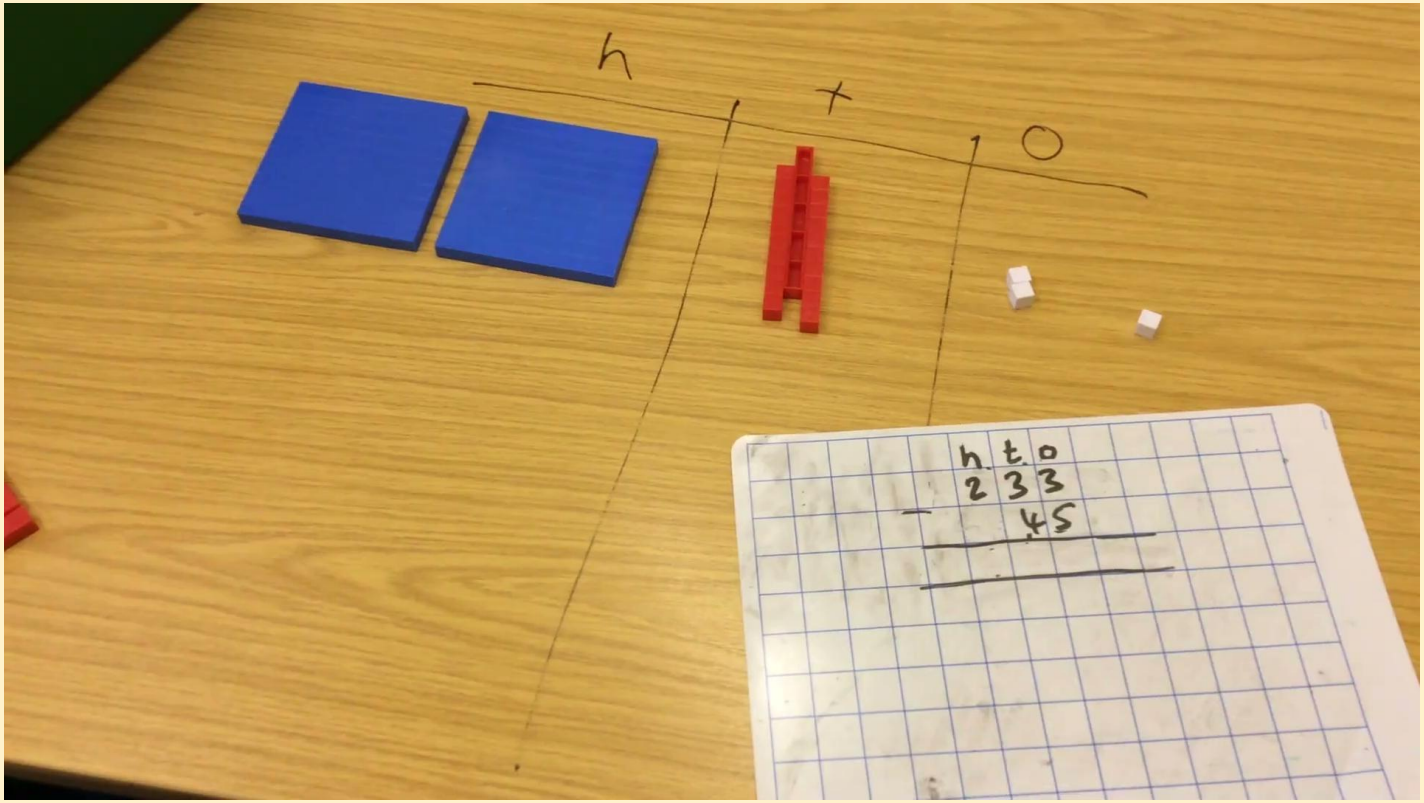
Vocabulary:
Exchanging

3 digit subtraction 1 exchange



Vocabulary:
Exchanging

3 digit subtraction 2 exchanges



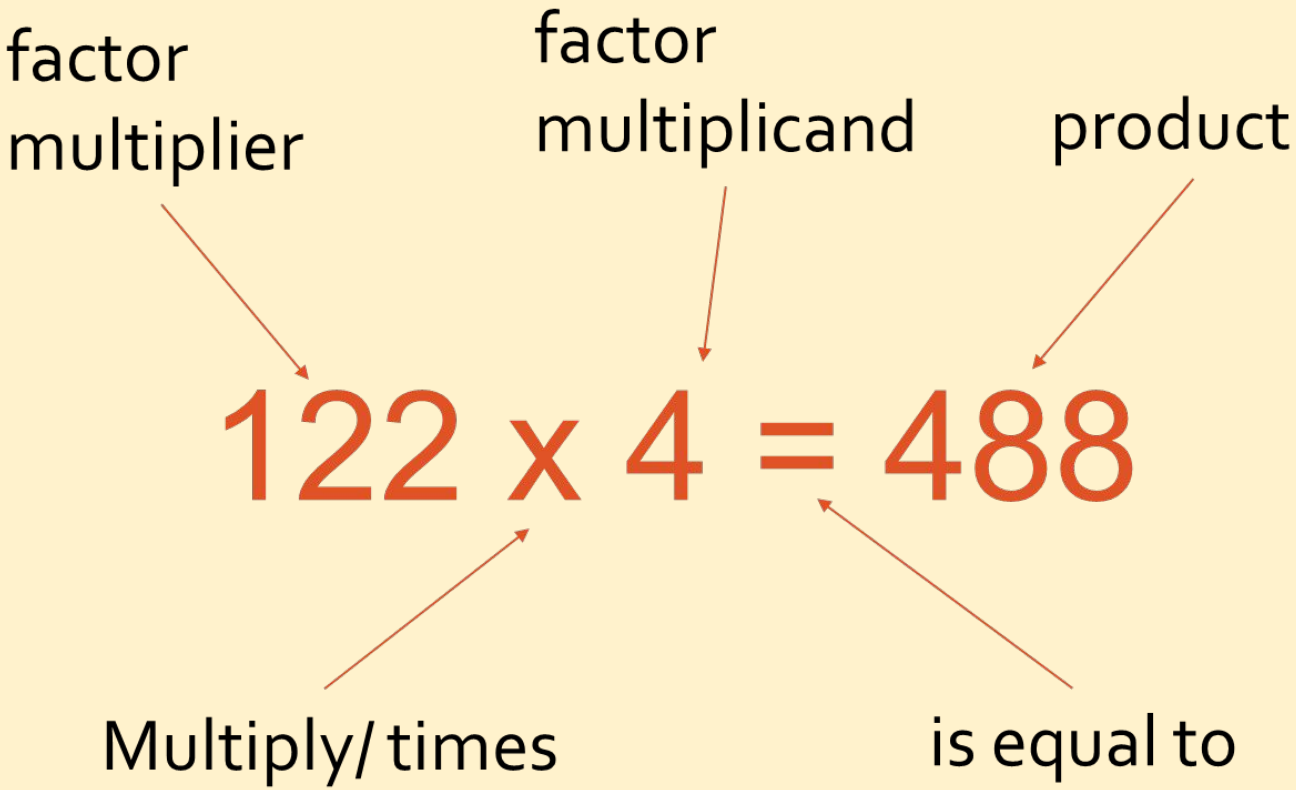
Vocabulary:
Exchanging

Multiplication

Spirit Federation

- lots of
- times
- multiply
- groups of
- product
- multiplied by
- multiple of
- repeated addition
- array




factor
multiplier
factor
multiplicand
product
122 x 4 = 488
Multiply/ times
is equal to

Fundamental structures

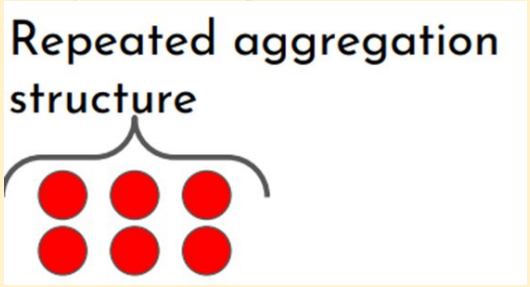
Spirit Federation

Repeated Addition

Spirit Federation

Key Stage 1

Keywords altogether lots of more product

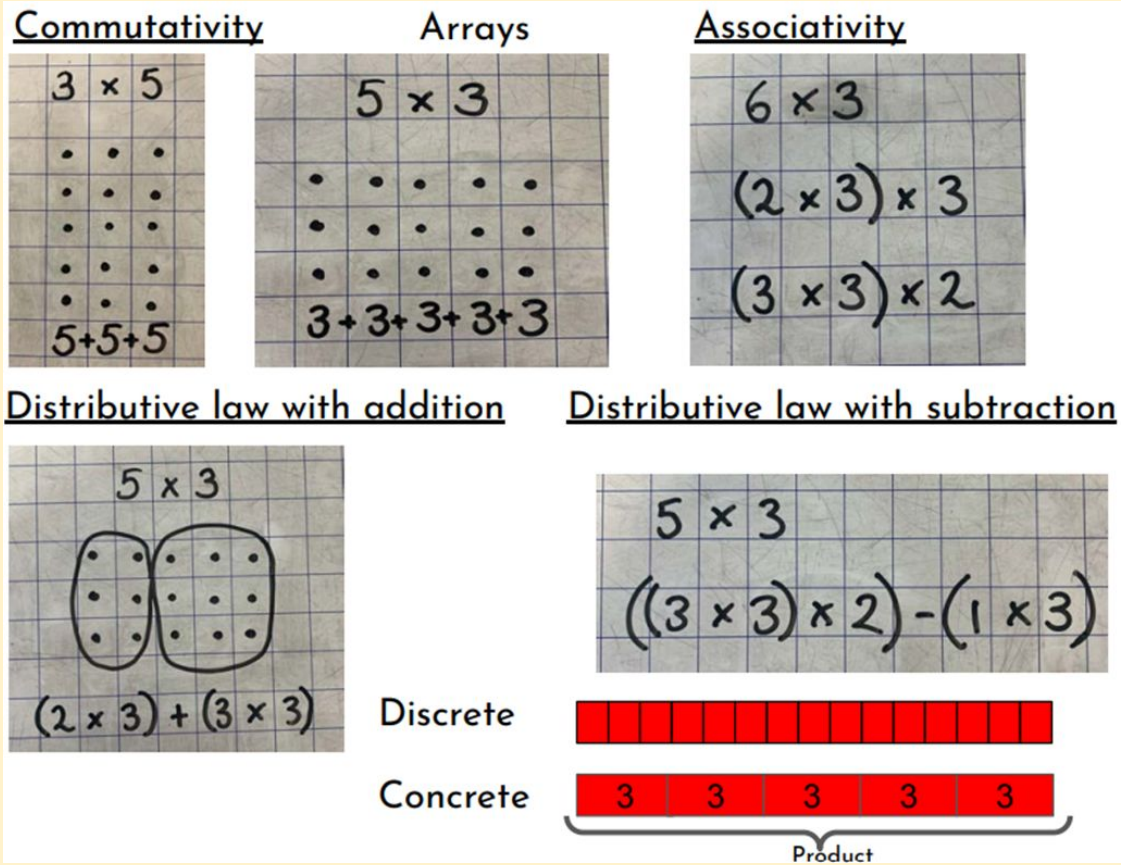


Word problem

Dylan bought a pack containing 3 cards from the shop.

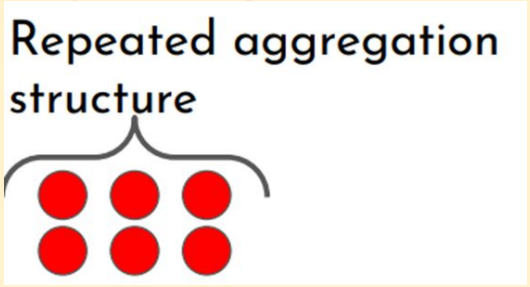
For his birthday, his mother bought him 5 more packs.

How many does he have altogether?



Key Stage 2

Keywords altogether lots of more product

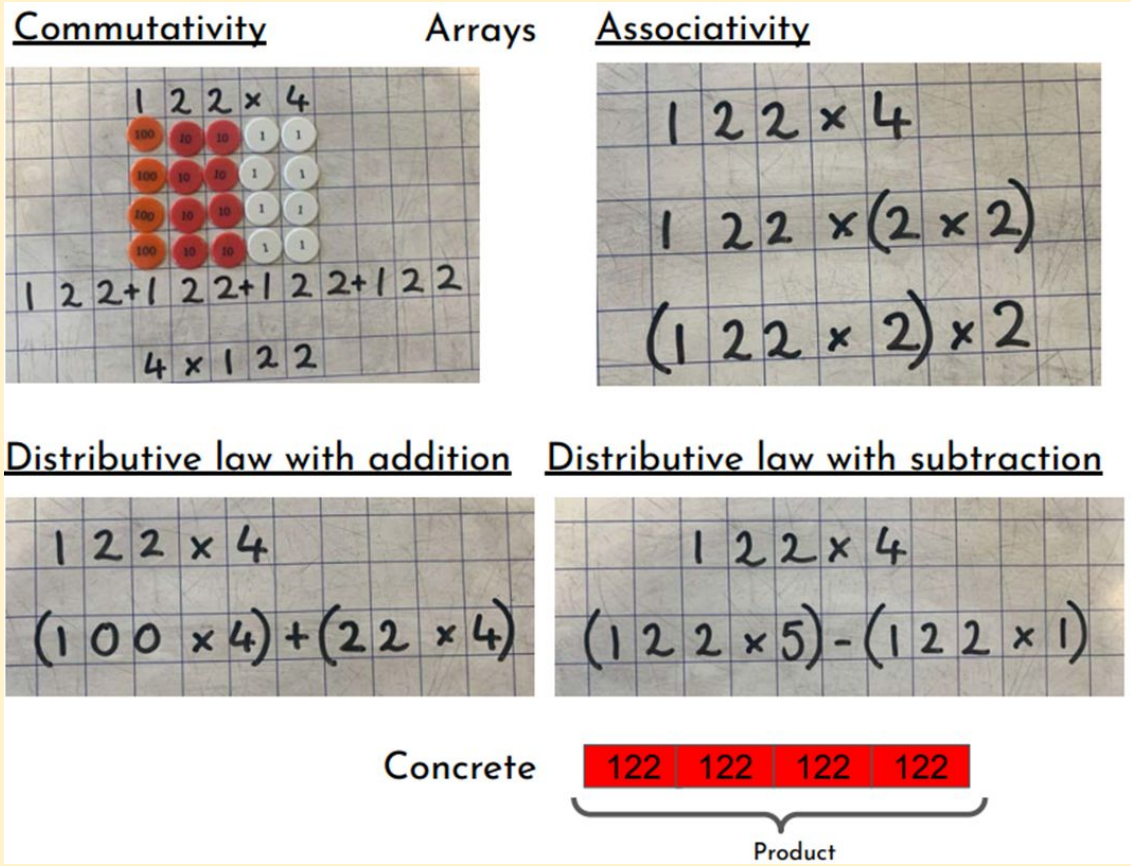


Word problem

Thomas bought a bag containing 4 lemons from the shop.

For his lemonade stall, his mother bought him 122 lots.

How many does he have altogether?

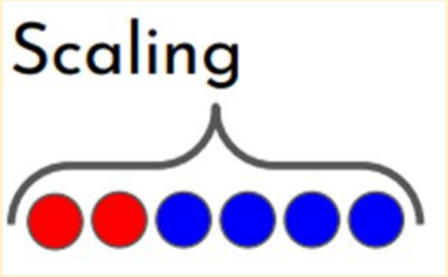


Scaling

Spirit Federation

Key Stage 1

Keywords scale factor doubling trebling so many times bigger



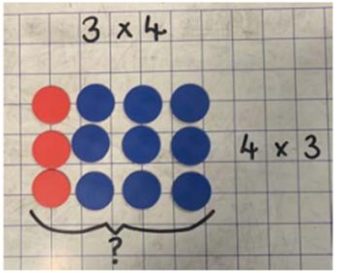
Word problem

My tower is 3 blocks tall.

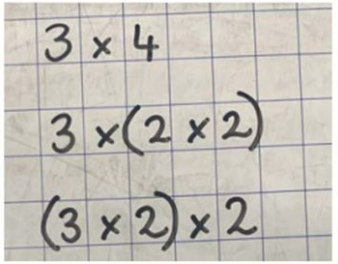
I built another tower 4 times higher.

How tall is my new tower?

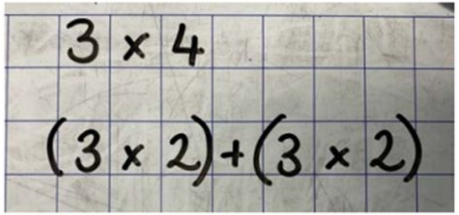
Commutativity



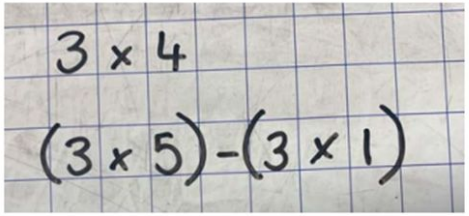
Associativity

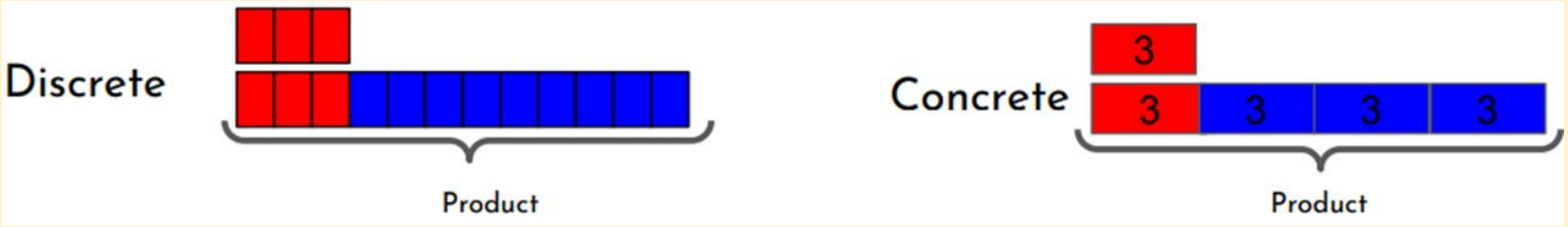


Distributive law with addition



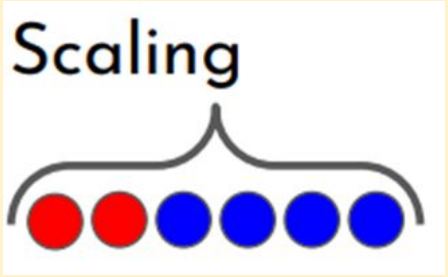
Distributive law with subtraction





Key Stage 2

Keywords scale factor doubling trebling so many times bigger

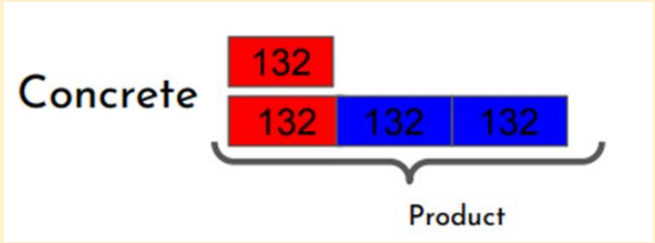


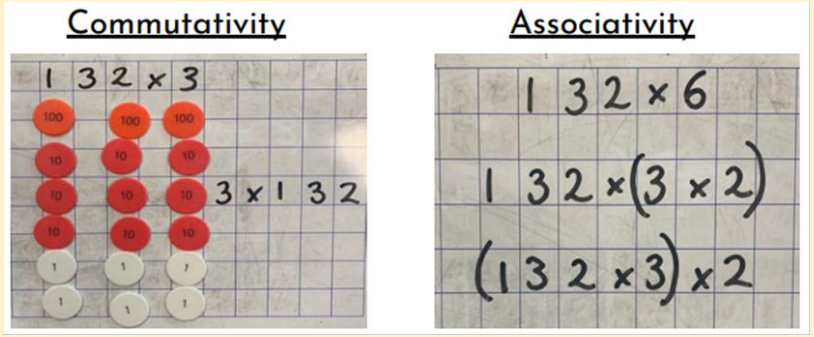
Word problem

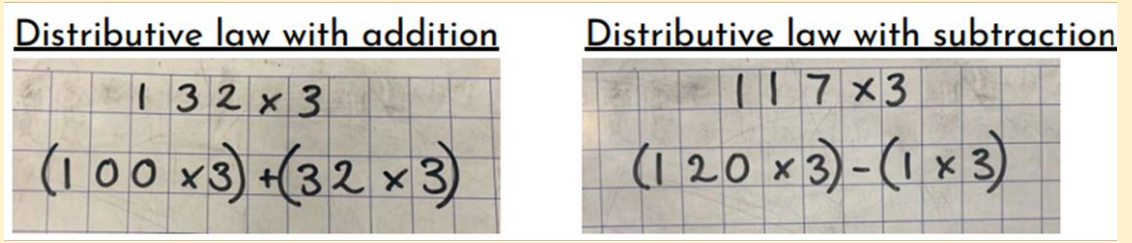
Tom's puppy was 132 cm in January.

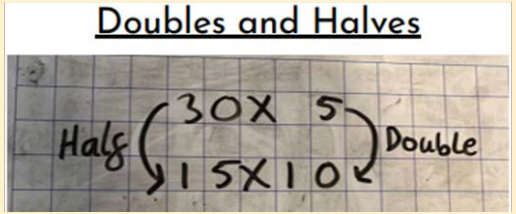
By the end of the year, his puppy had grown three times greater.

How tall is the puppy now?









Manipulatives

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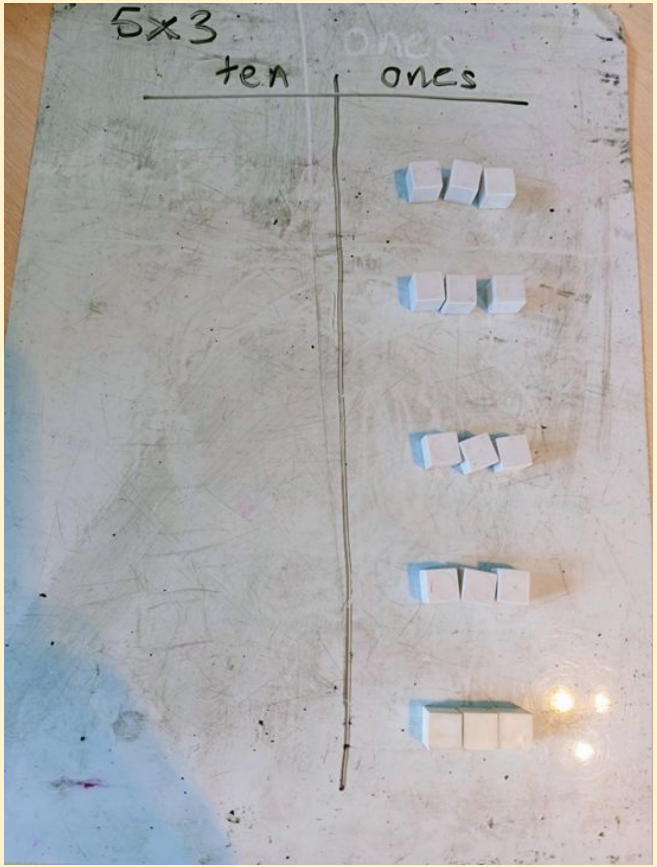
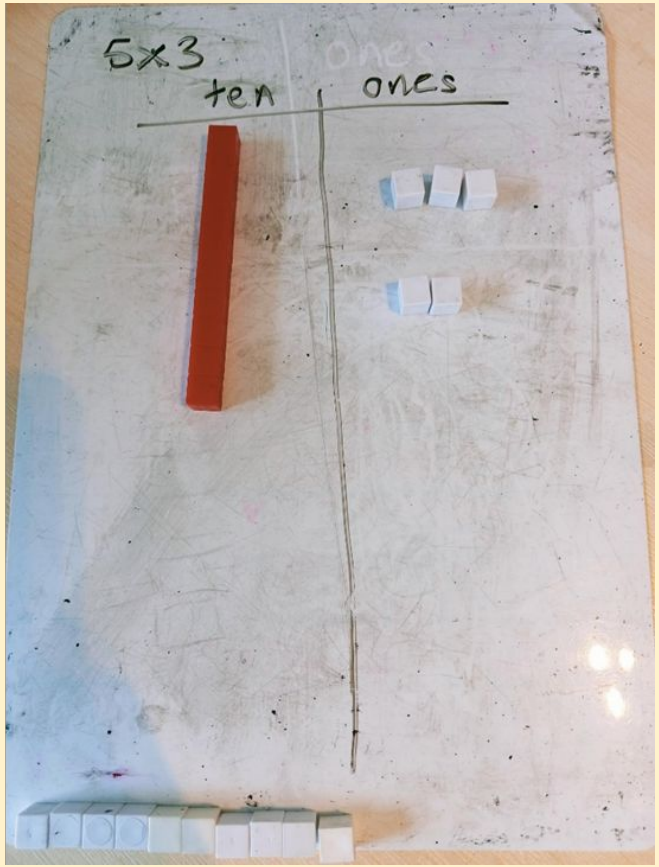
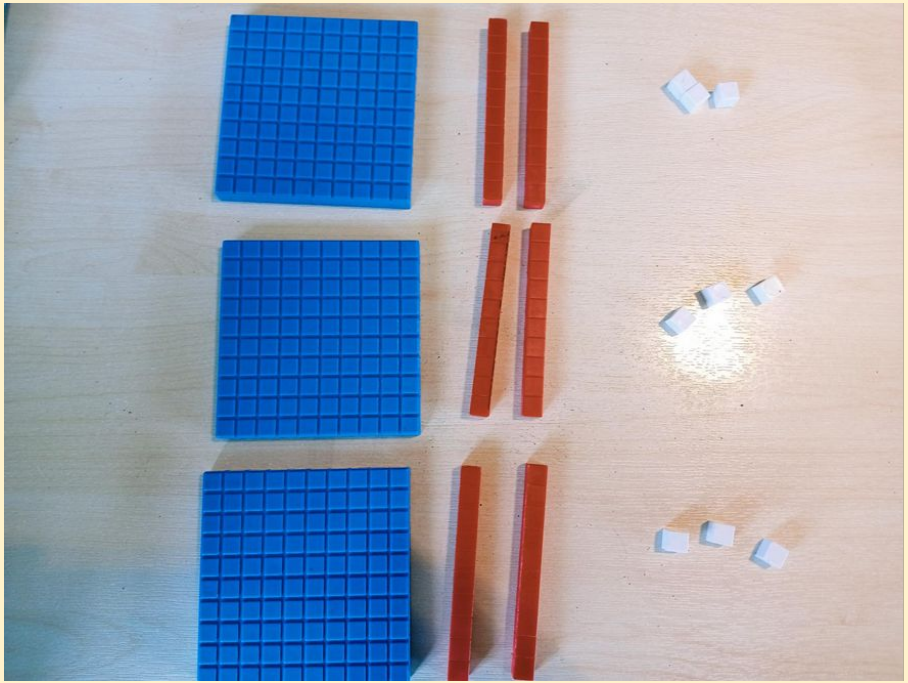
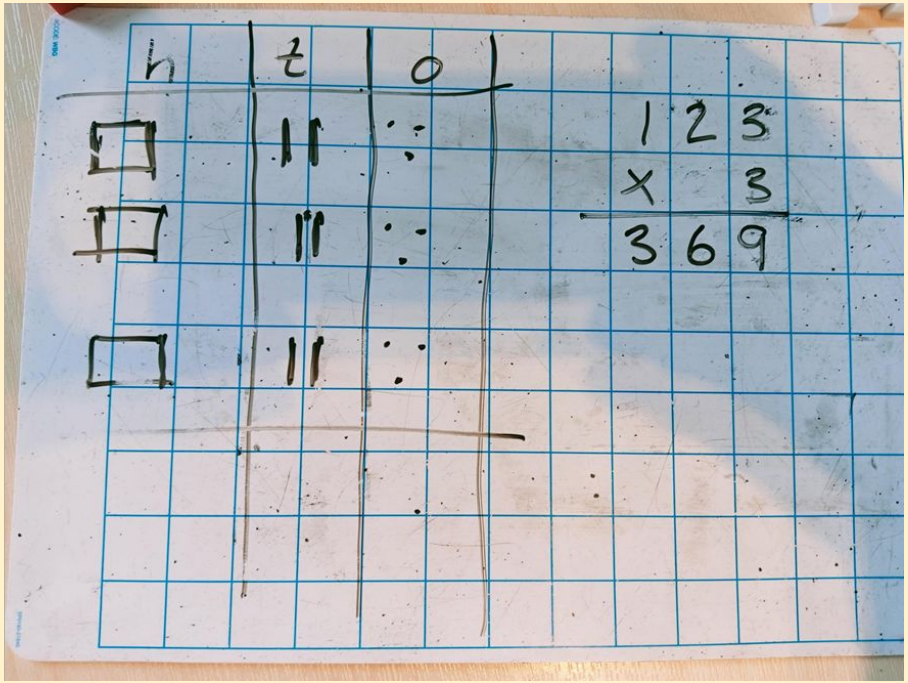
Key Stage 1 Manipulatives



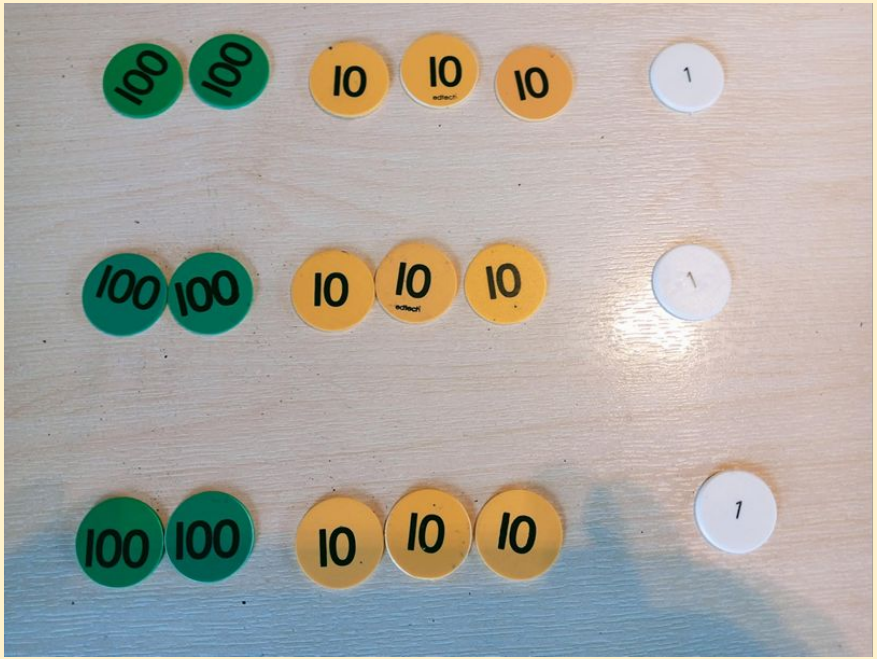


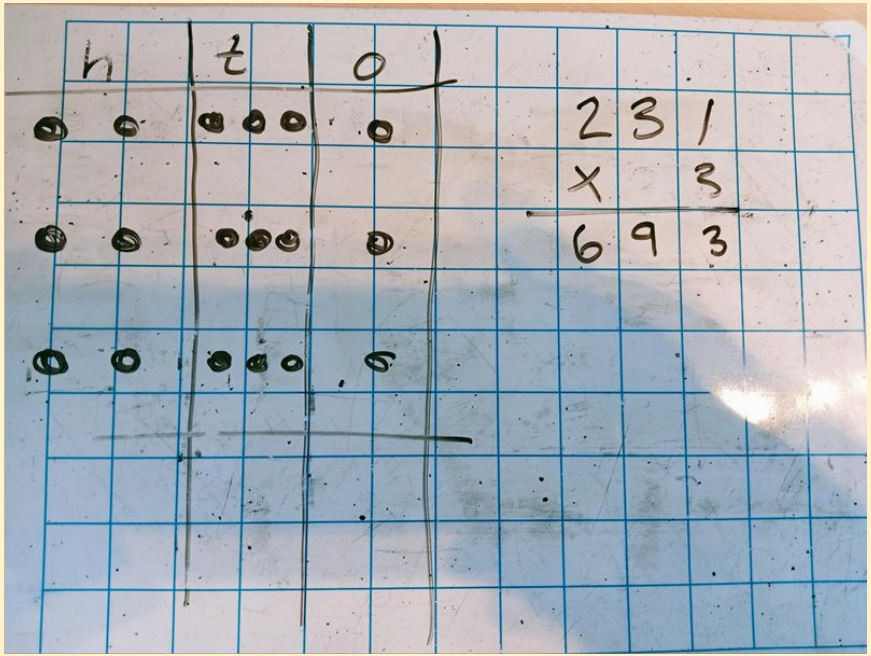
Key Stage 2 Manipulatives



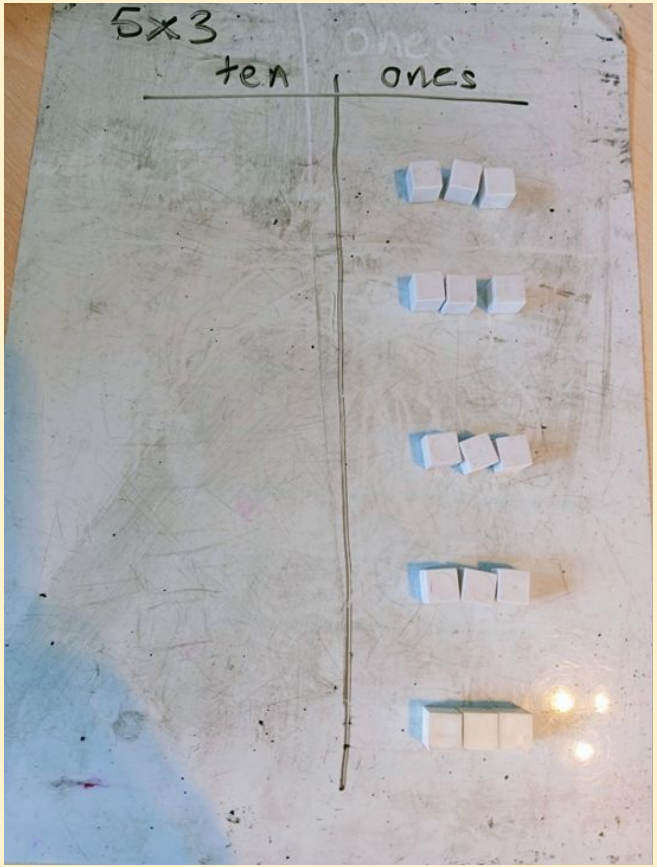


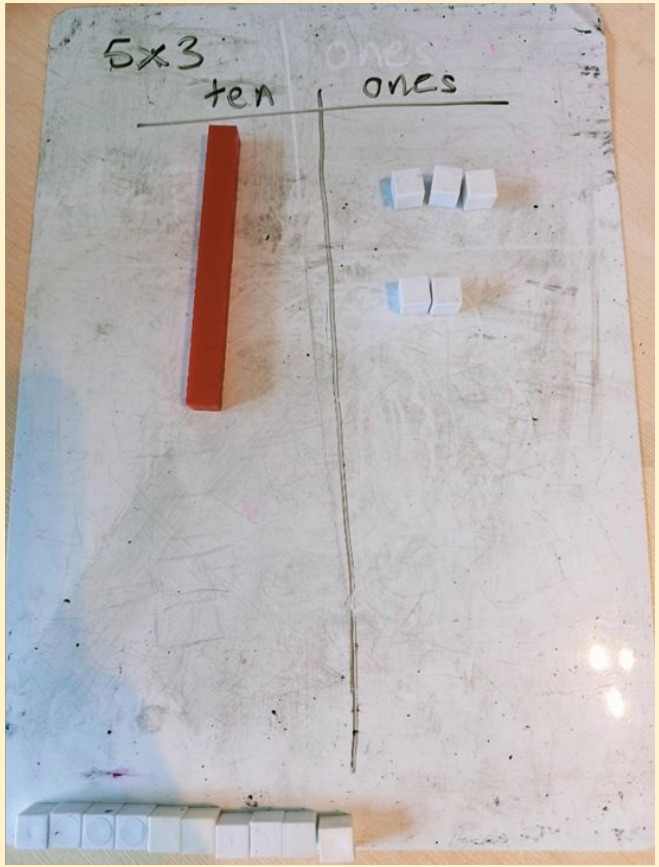
Key Stage 2 Manipulatives



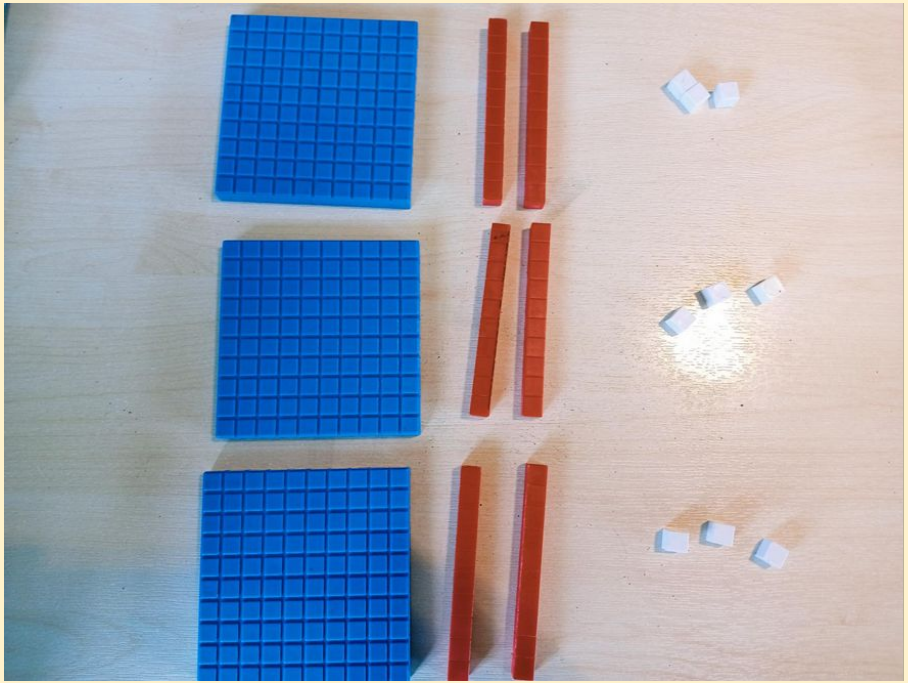


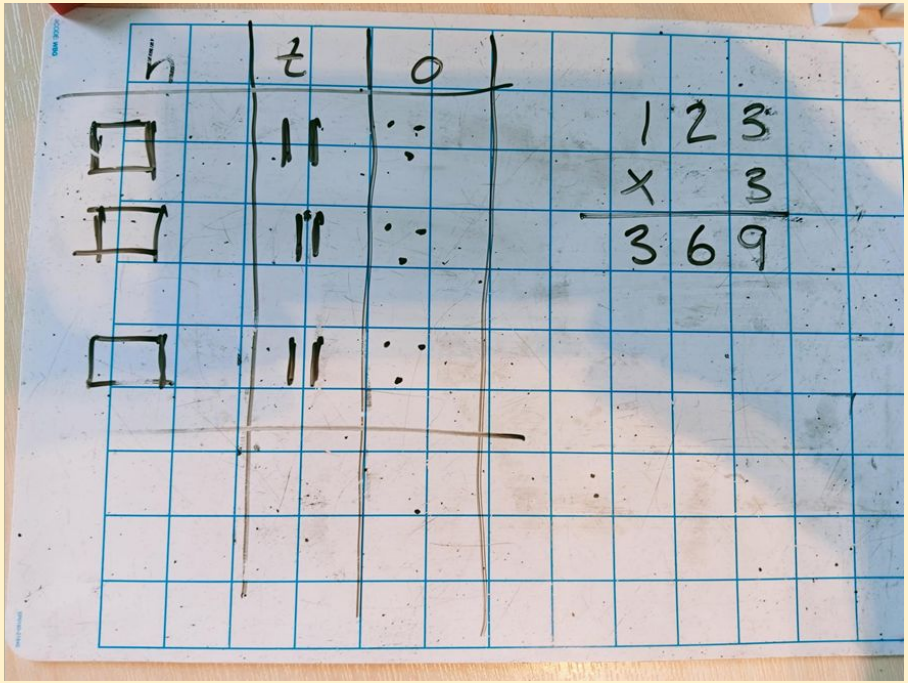
Key Stage 1 Manipulatives



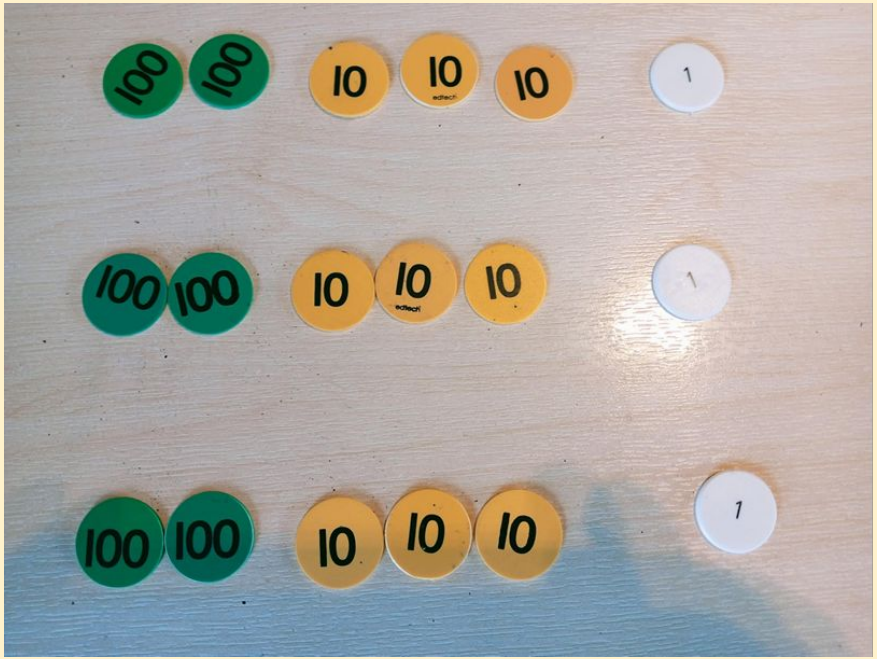


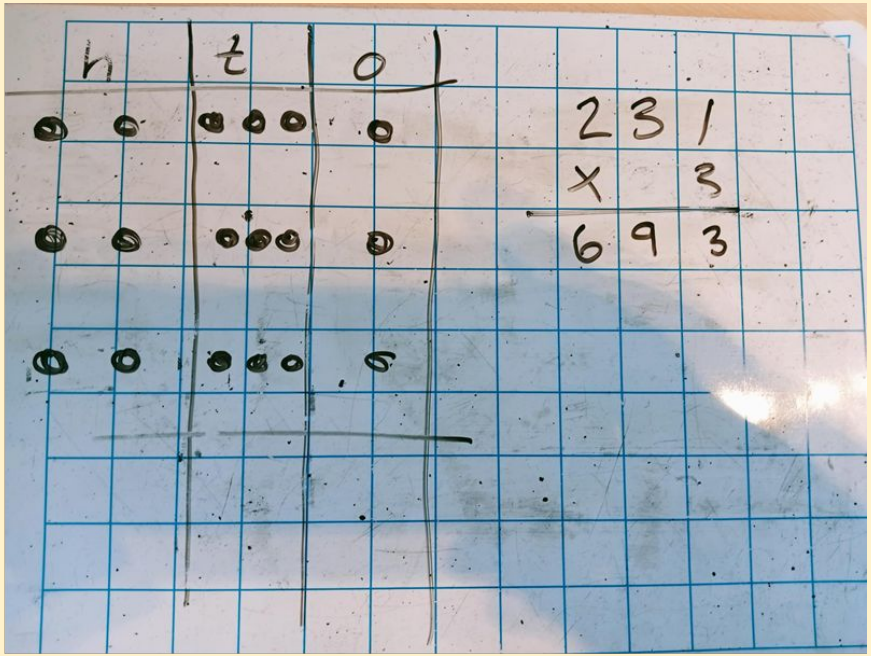
Key Stage 2 Manipulatives





Key Stage 2 Manipulatives





Progression of written methods

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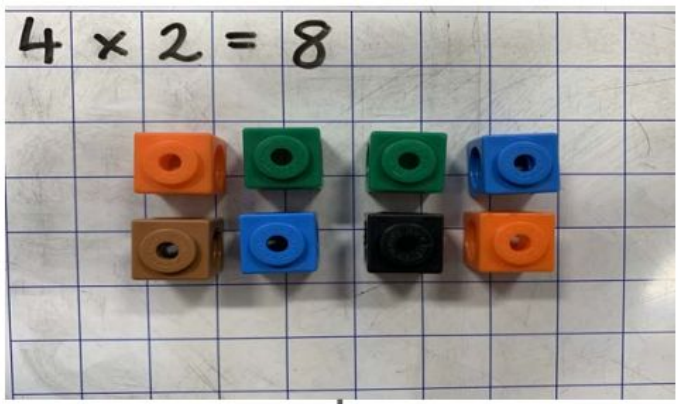
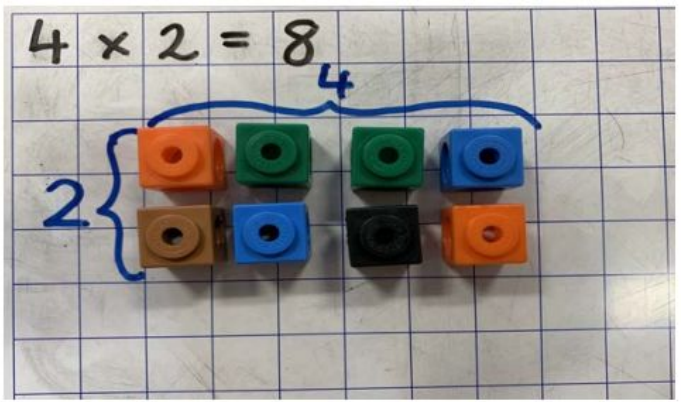
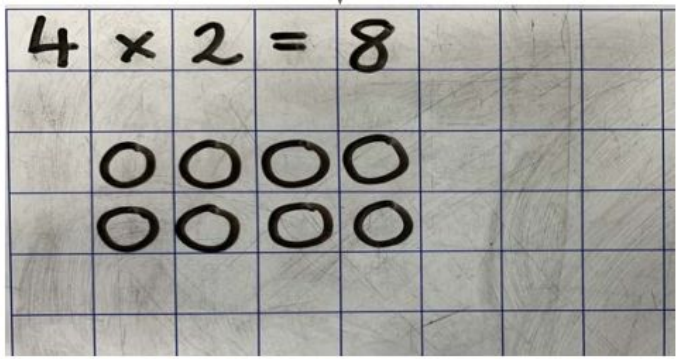
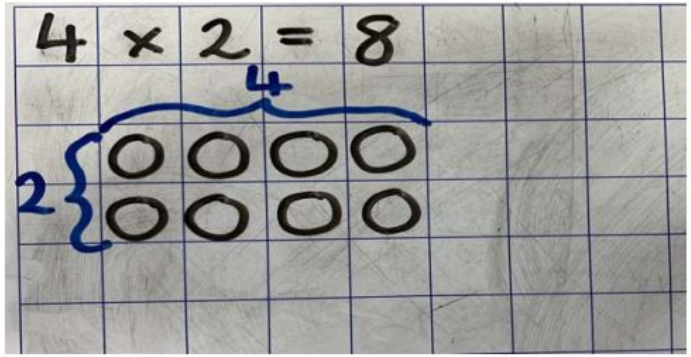
Arrays

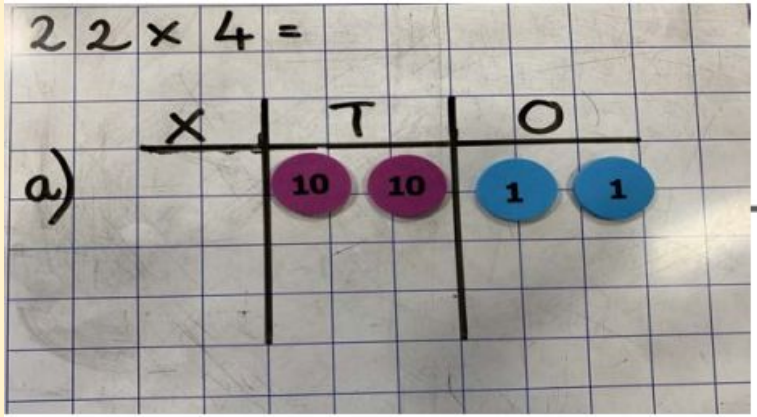


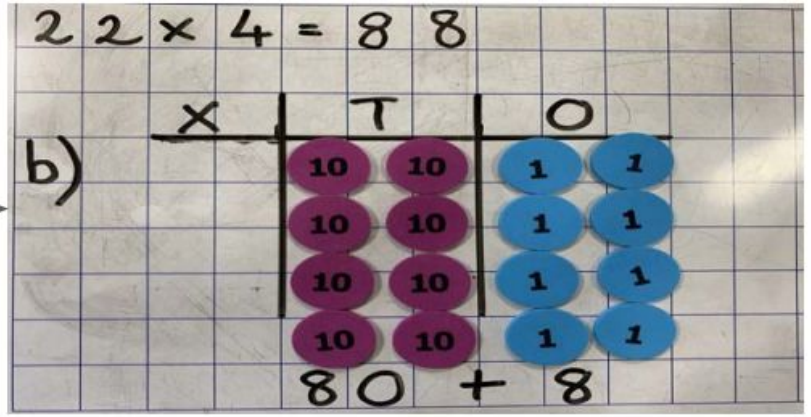


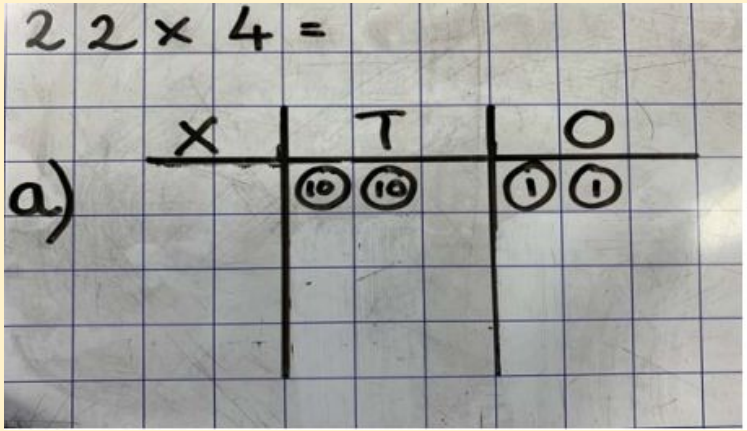


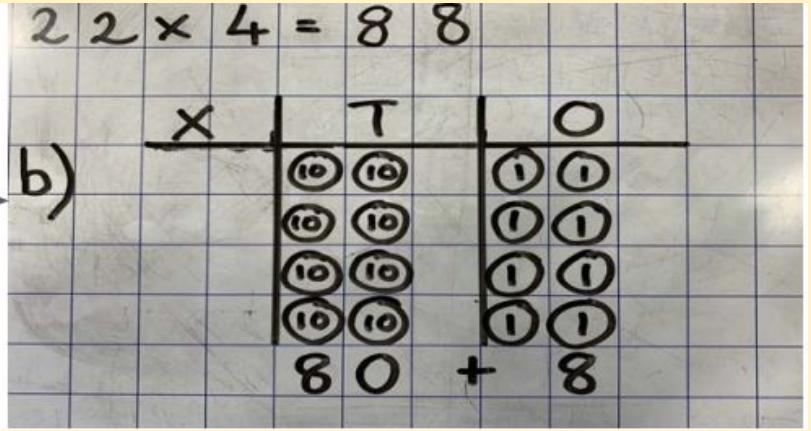


Arrays to grid method (no exchange)

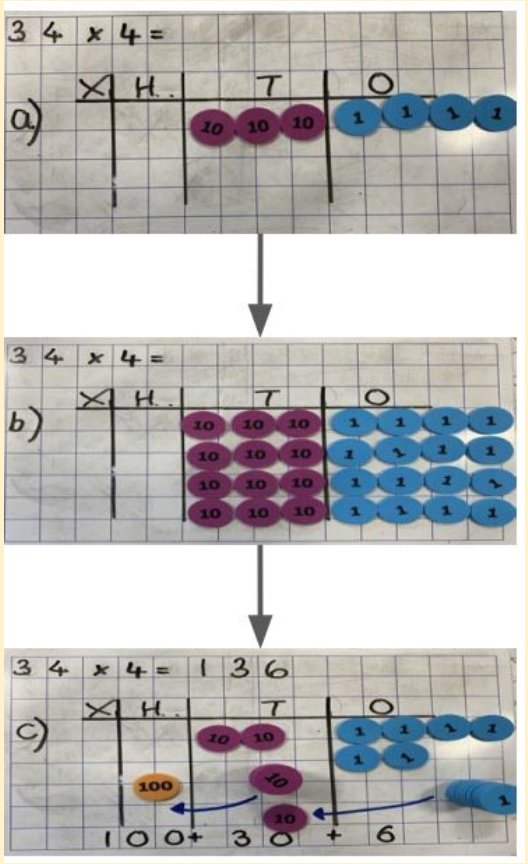


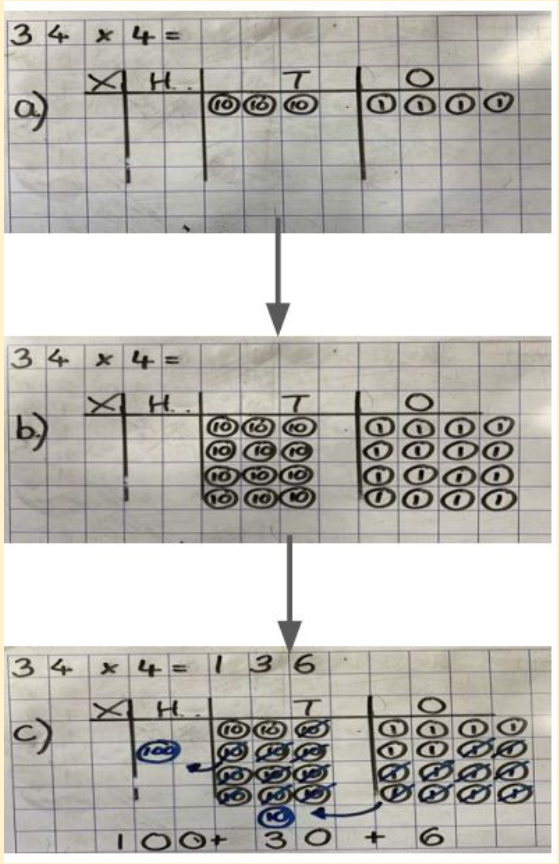




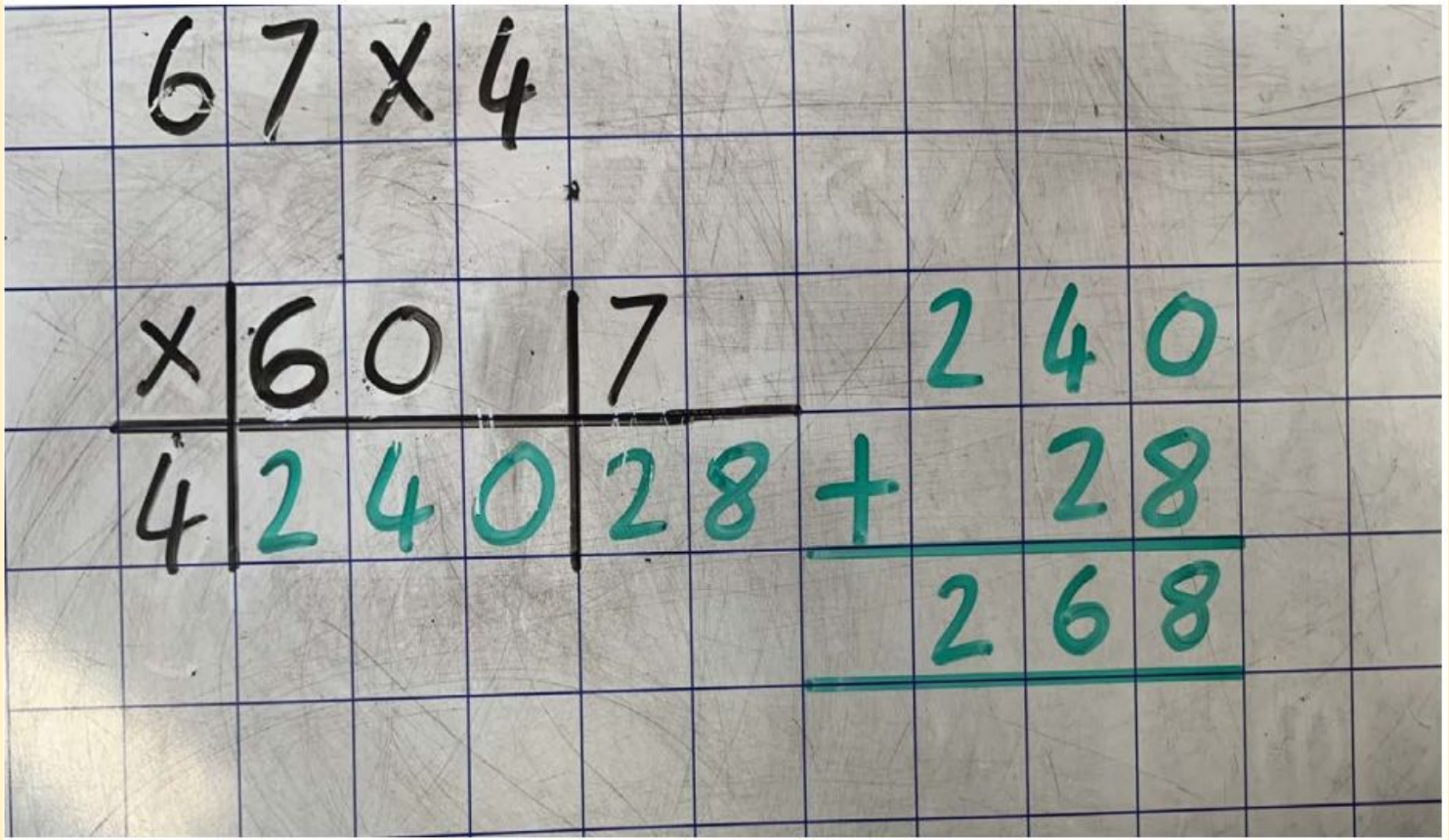


Arrays to grid method (with exchange)

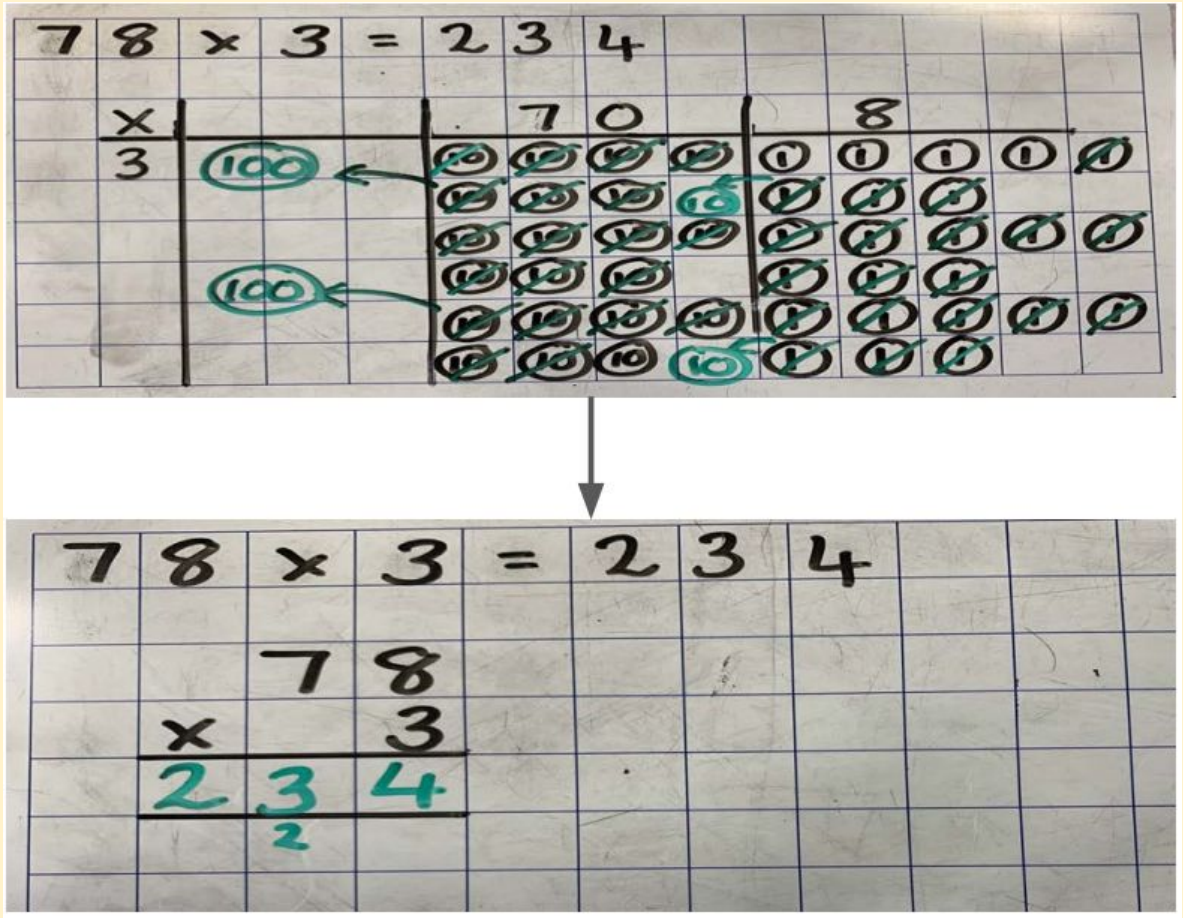




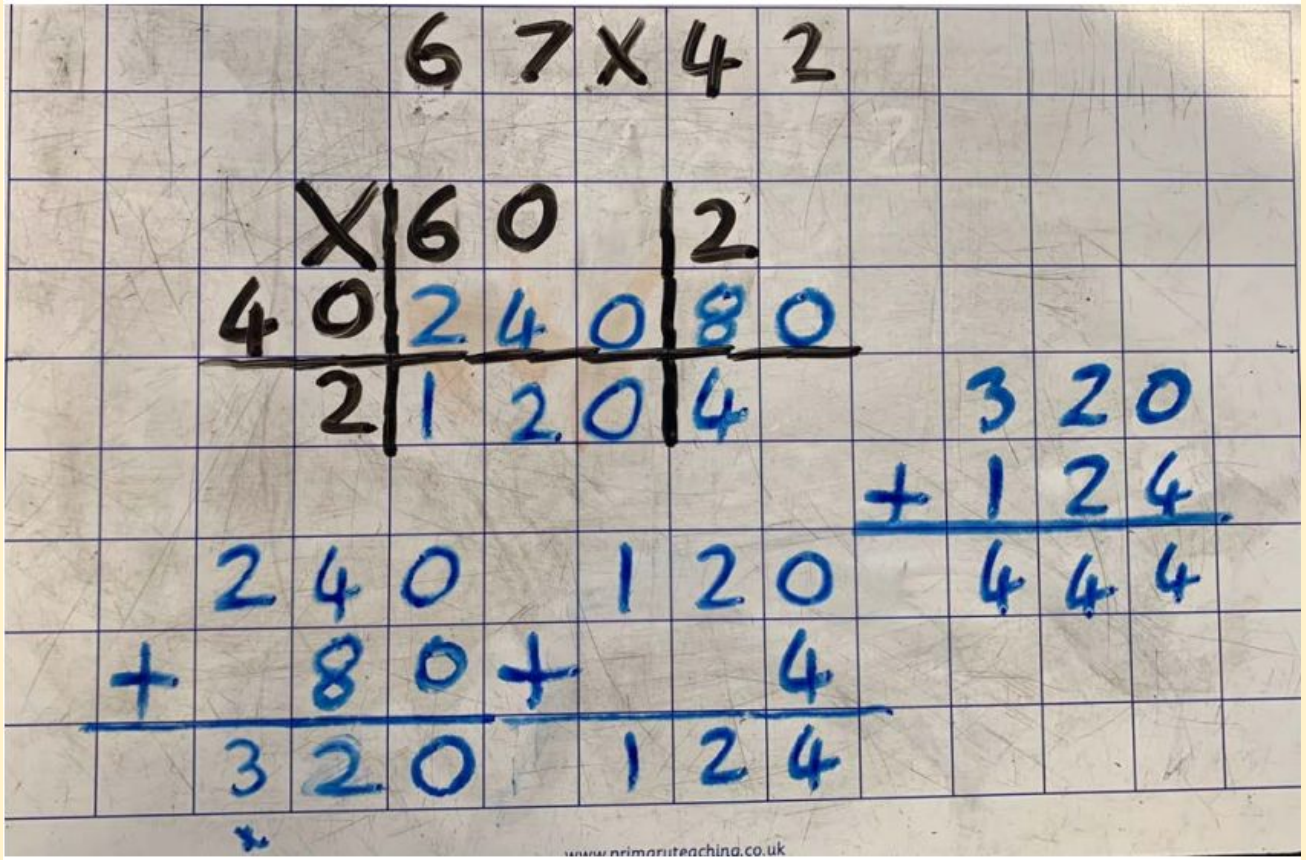
Area Method (multiplying by 1 digit numbers)



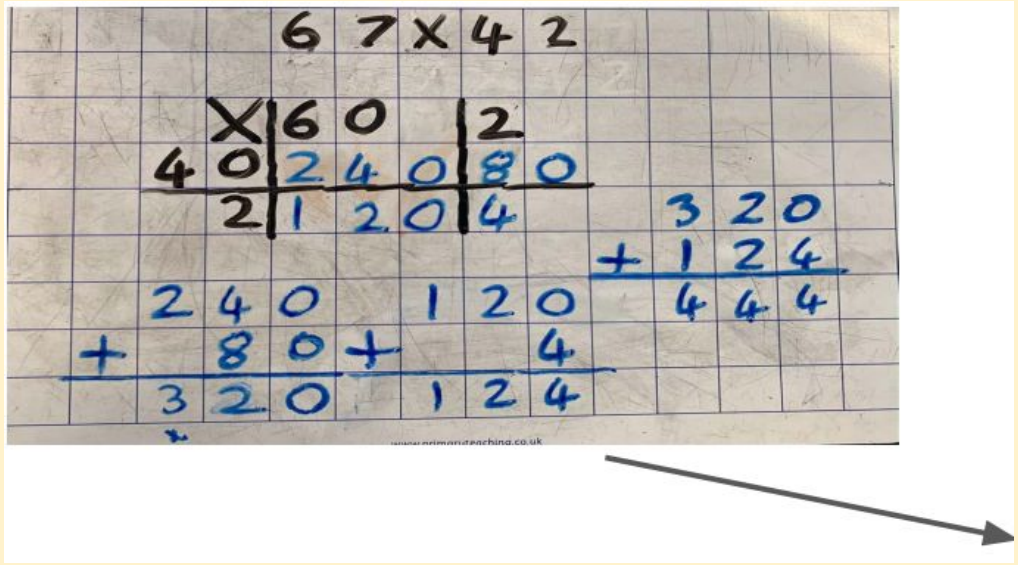
Grid to column method (multiplying by 1 digit numbers

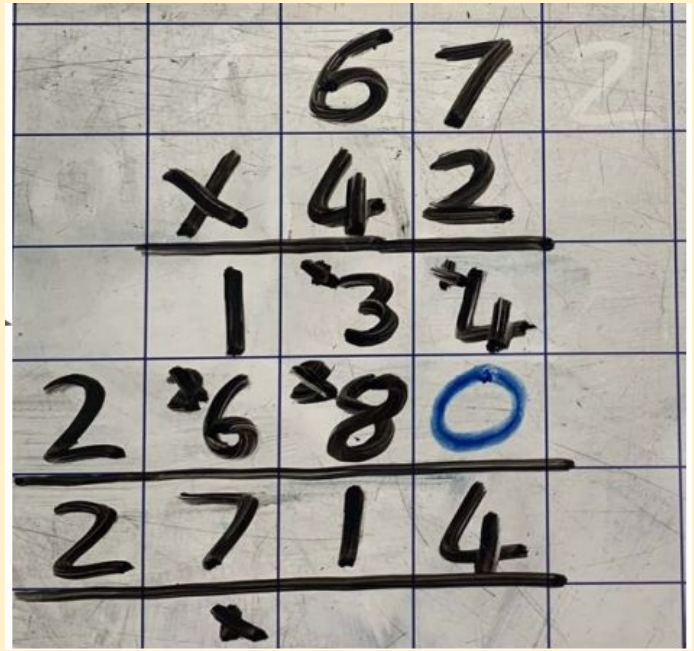


Area Method (multiplying by 2 digit numbers)

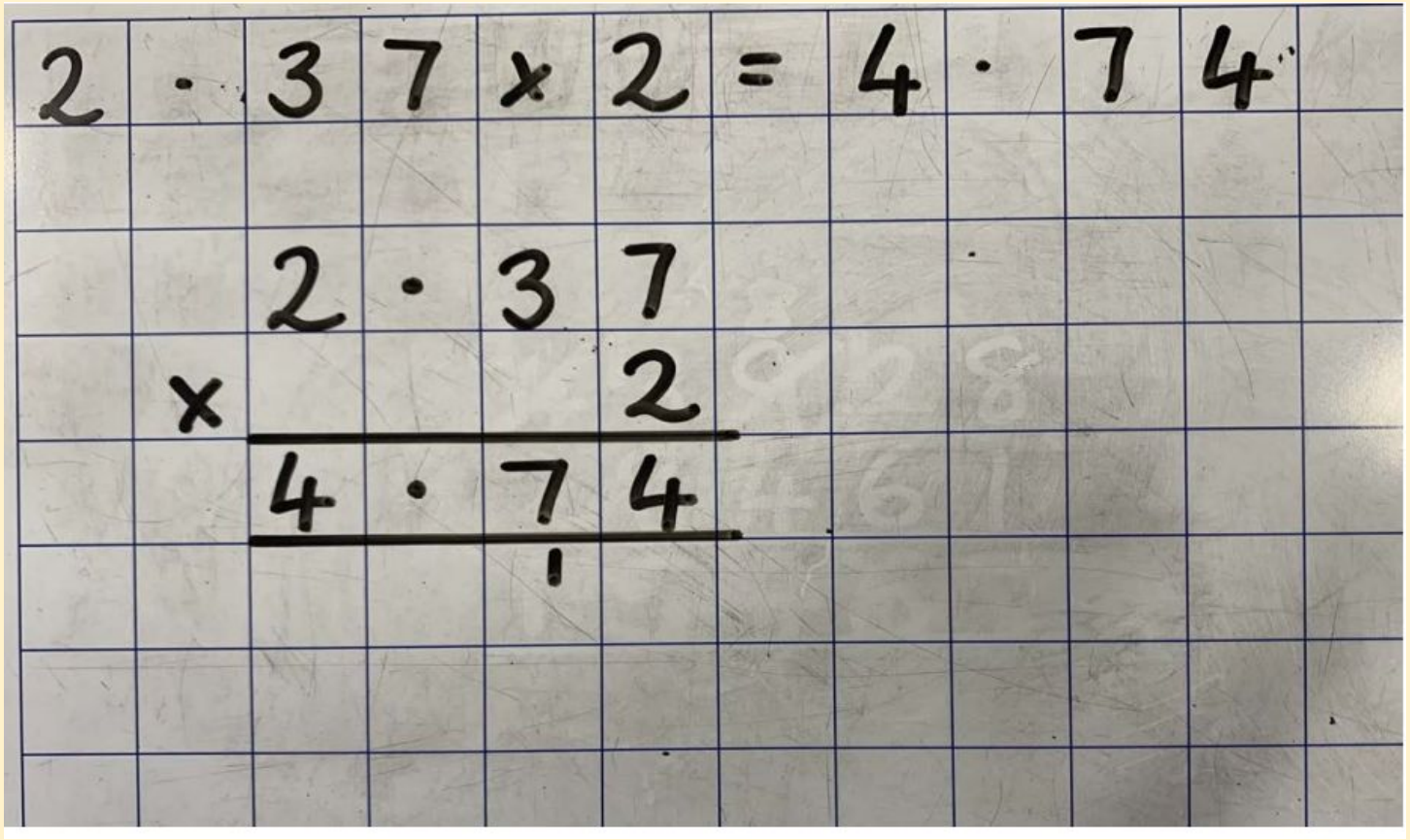


Grid to column method (multiplying by 2 digit numbers)





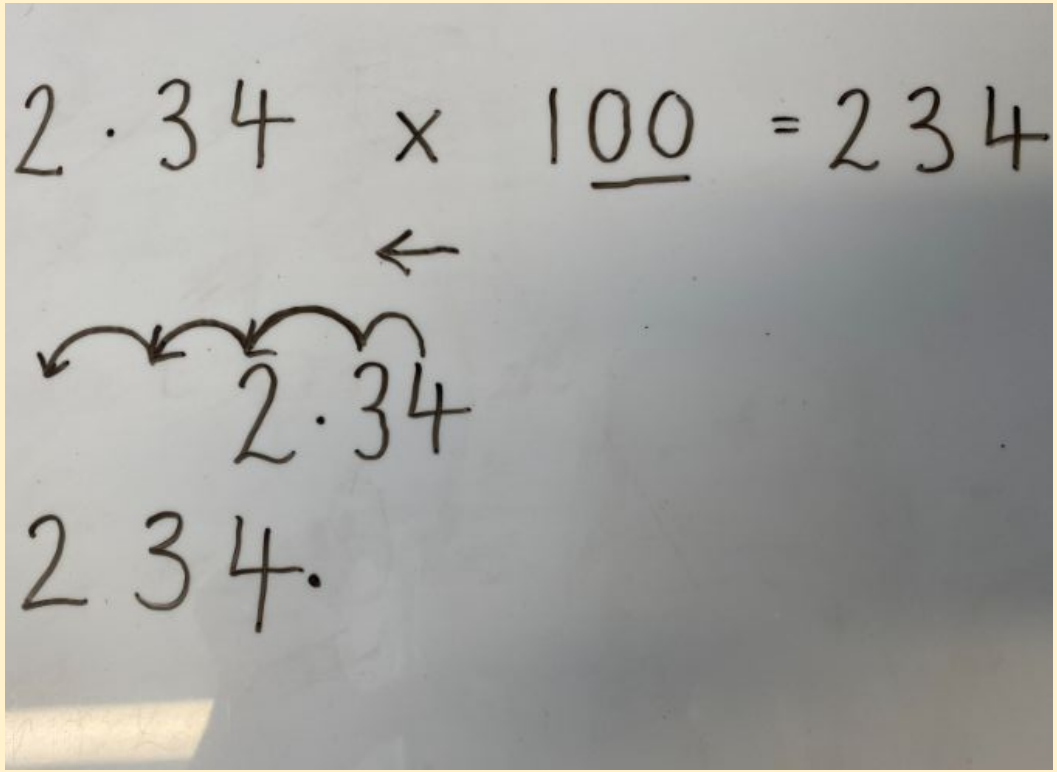
Multiplying decimals



Multiplying by powers of 10

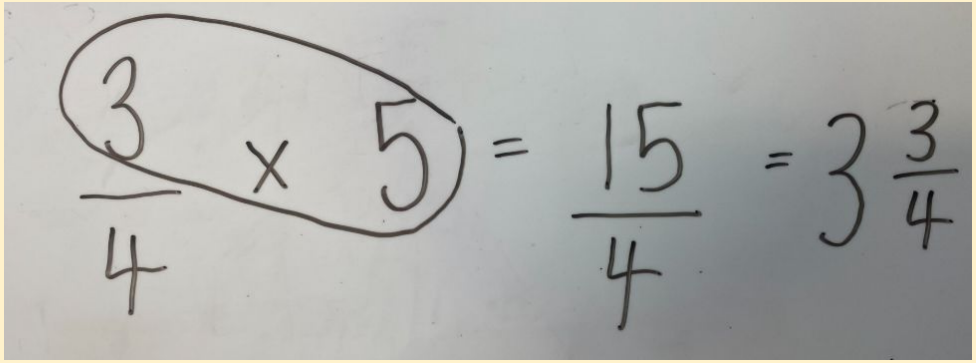
The decimal point **does not** move.

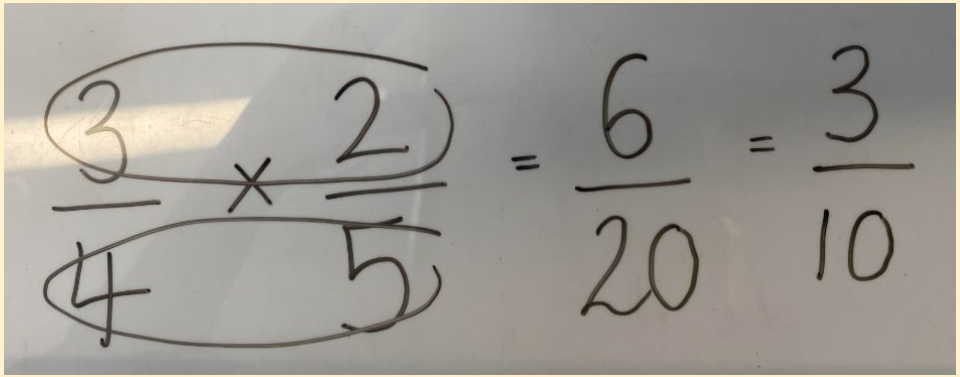
Count the 0's and move each digit the same number of place value places to the left.



Multiplying fractions

Multiply the numerator by the integer.
The **denominator stays the same**.



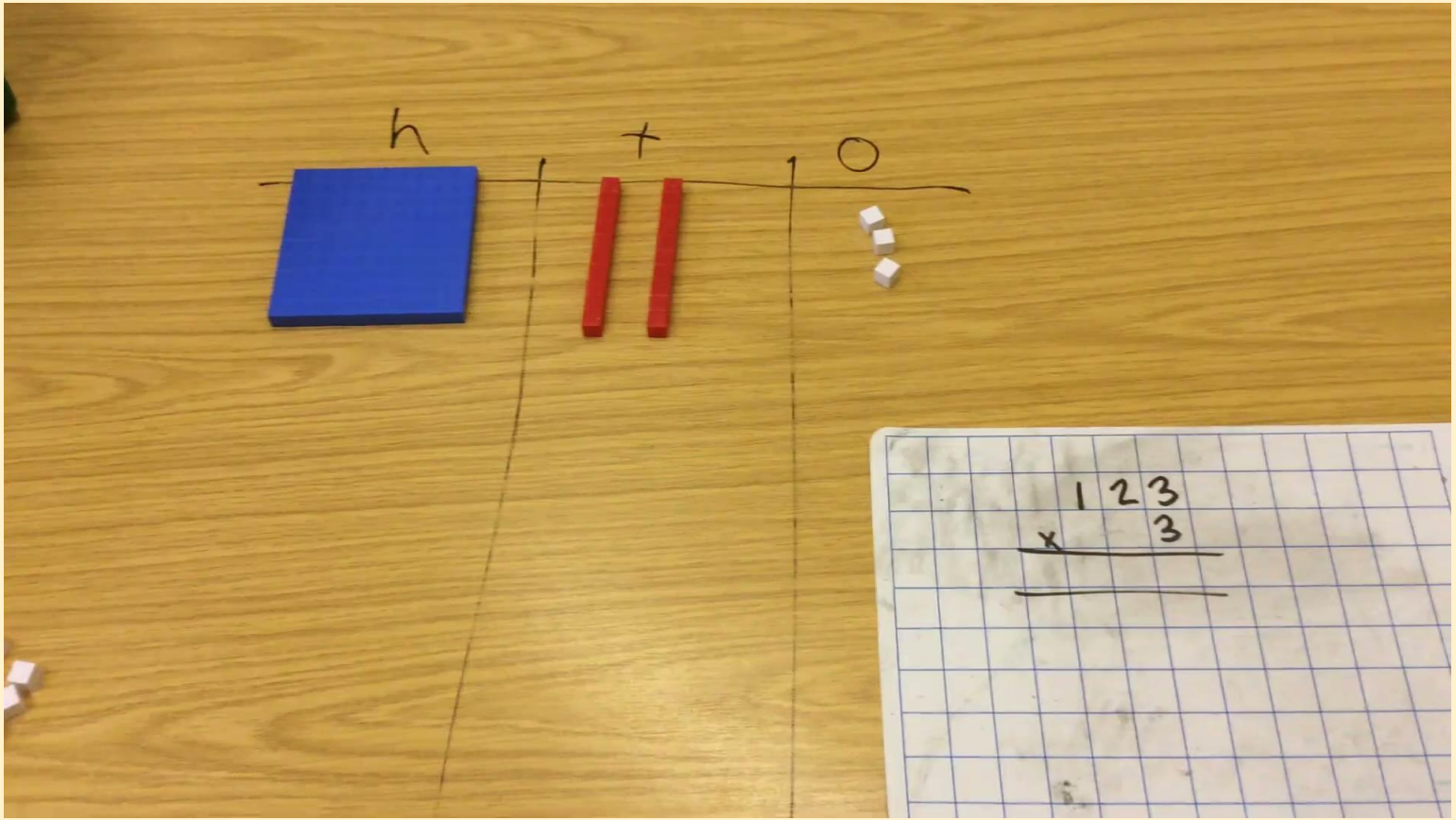


Multiply the numerator by the numerator and the denominator by the denominator.

Multiplication Manipulatives videos

Spirit Federation

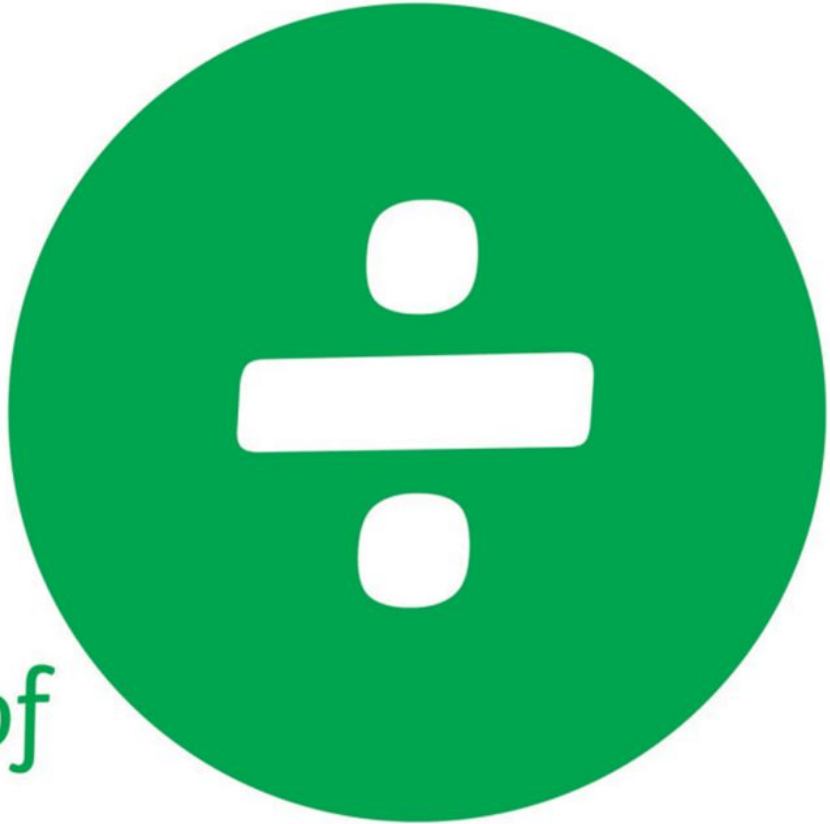
Key Stage 2 3 digit by 1 digit

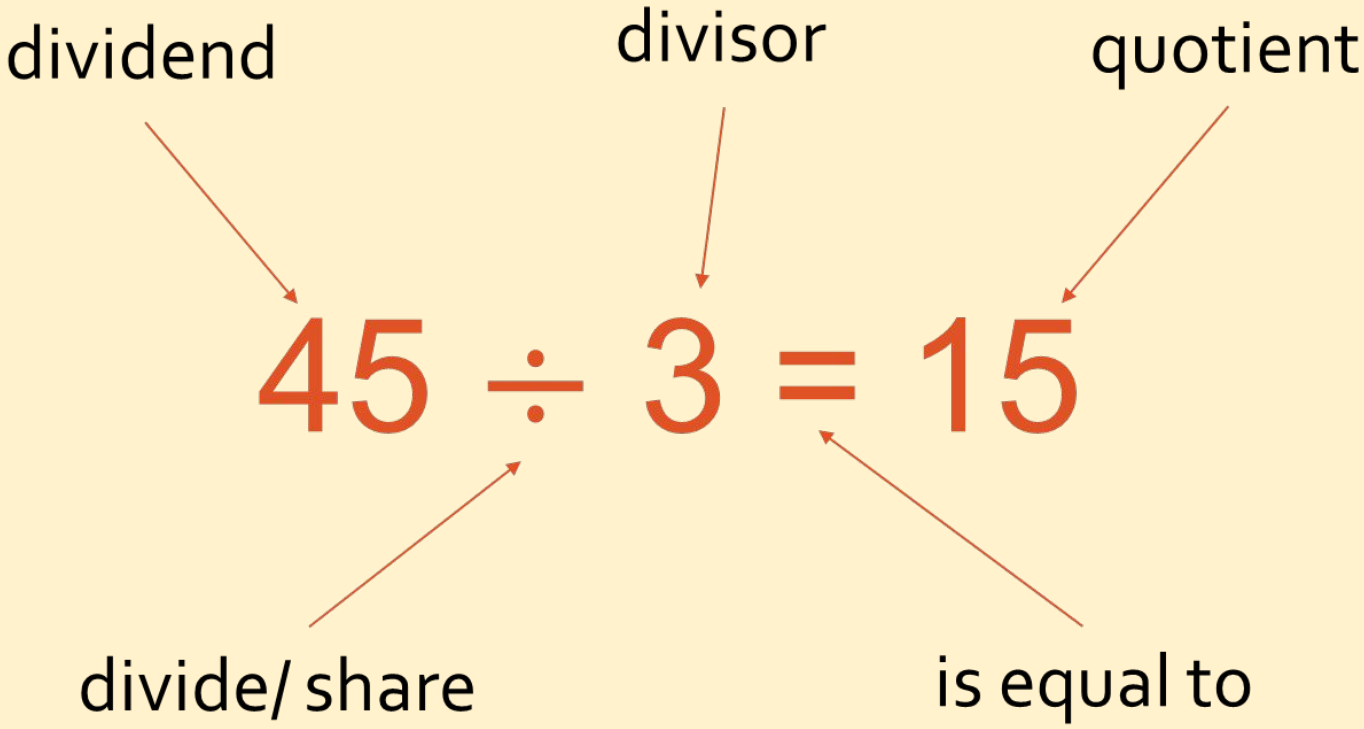


Division

Spirit Federation

- divide
- divided by
- divided into
- share
- share equally
- equal groups of




dividend
divisor
quotient
45 ÷ 3 = 15
divide/ share
is equal to

Fundamental structures

Spirit Federation

Sharing or Partitive

Spirit Federation

Key Stage 1 Keywords share group equally

Partitive

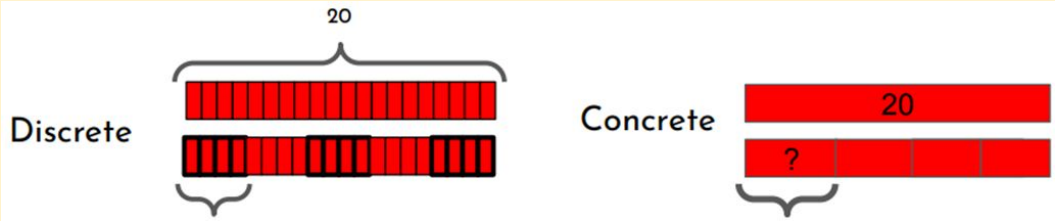


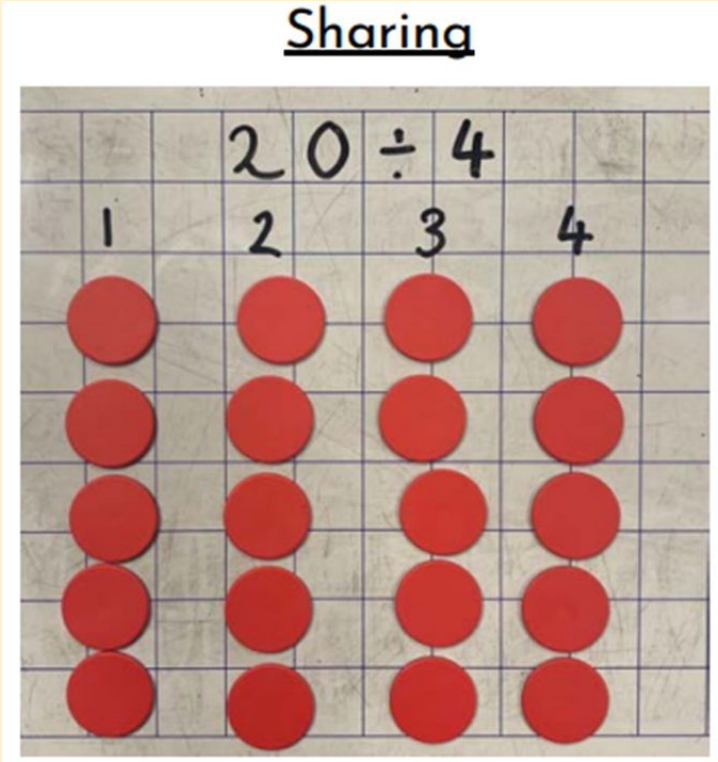
Word problem - sharing

Jennifer had 20 stickers leftover.

She shared her stickers with four of her friends.

How many did each friend receive?





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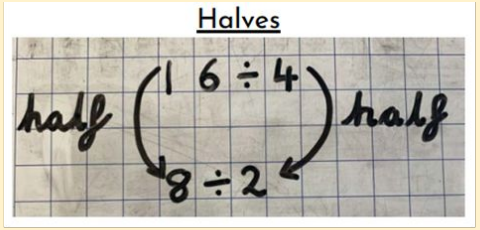
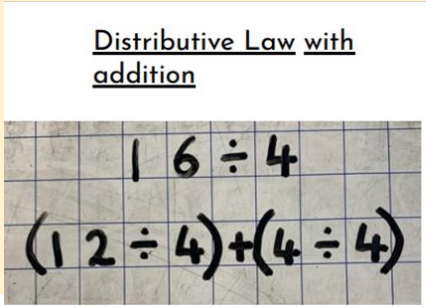
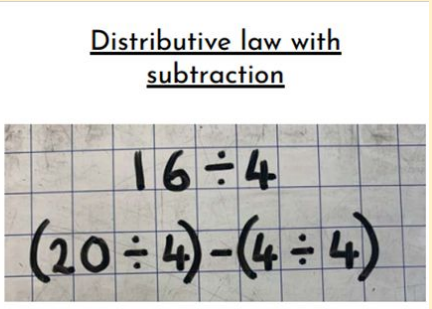
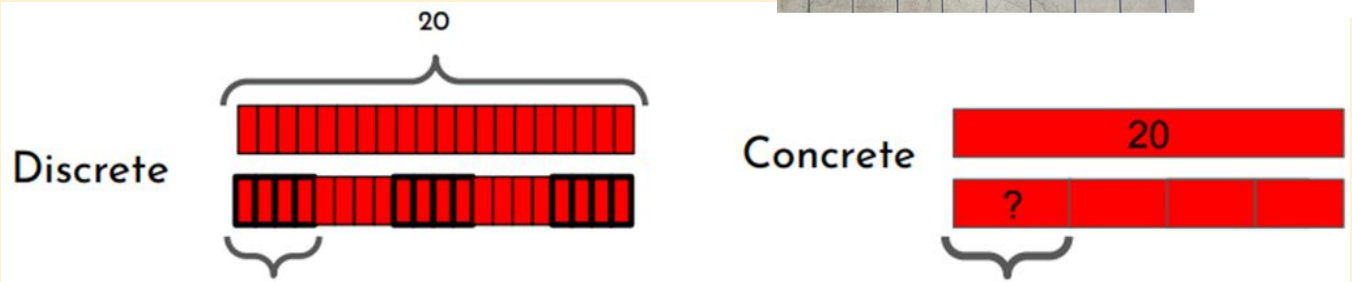


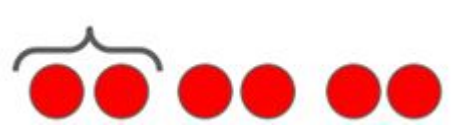


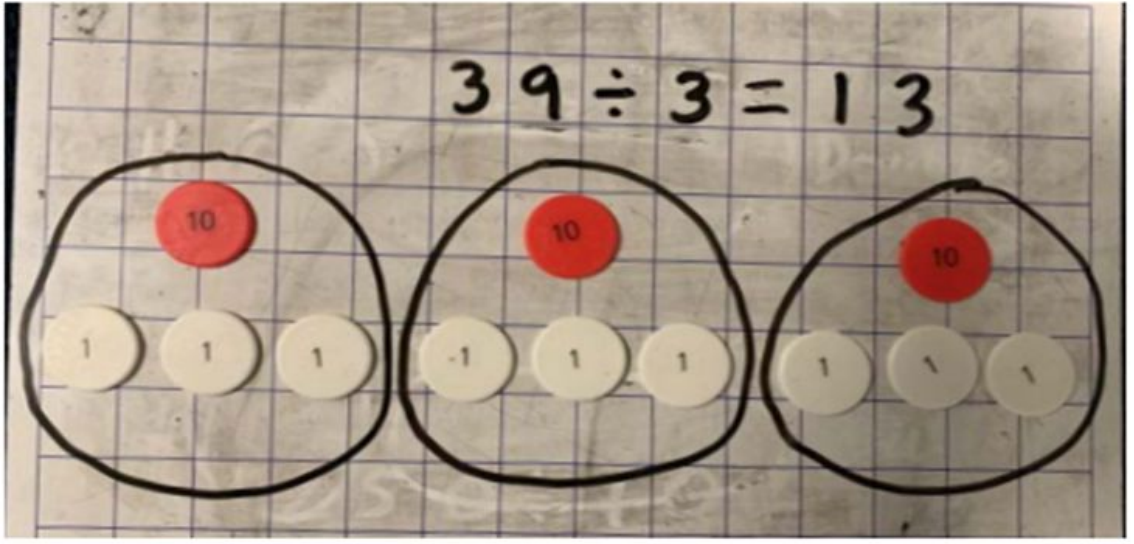




Key Stage 2 Keywords share group equally

Partitive





Word problem - sharing

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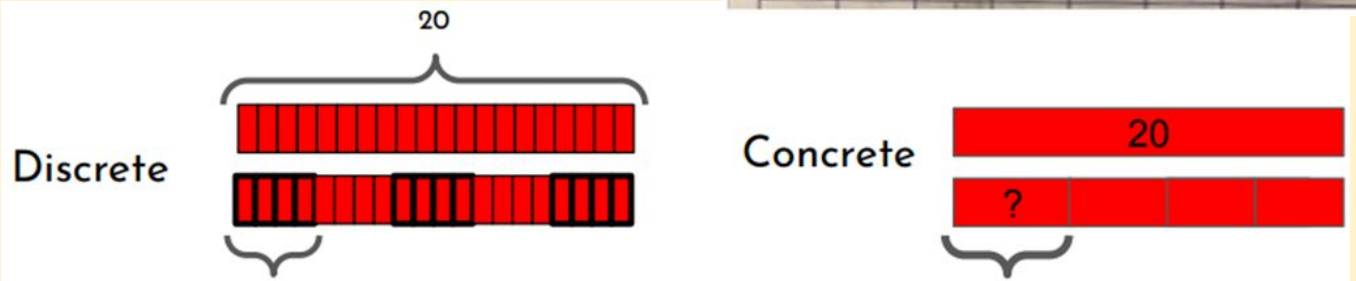

Key Stage 2

Keywords share group equally

Partitive



Word problem - sharing

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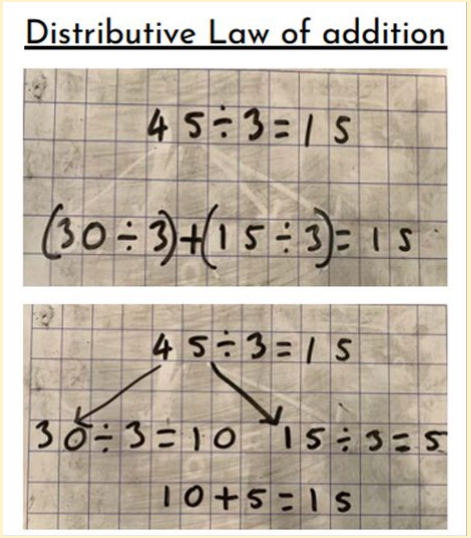
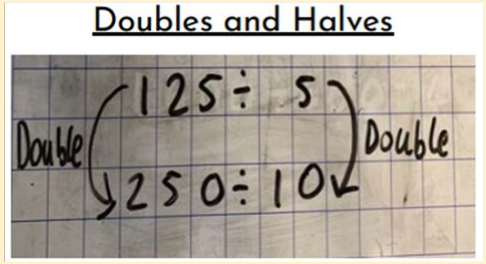
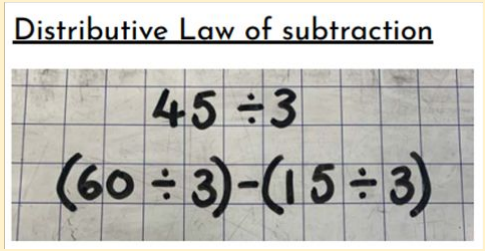
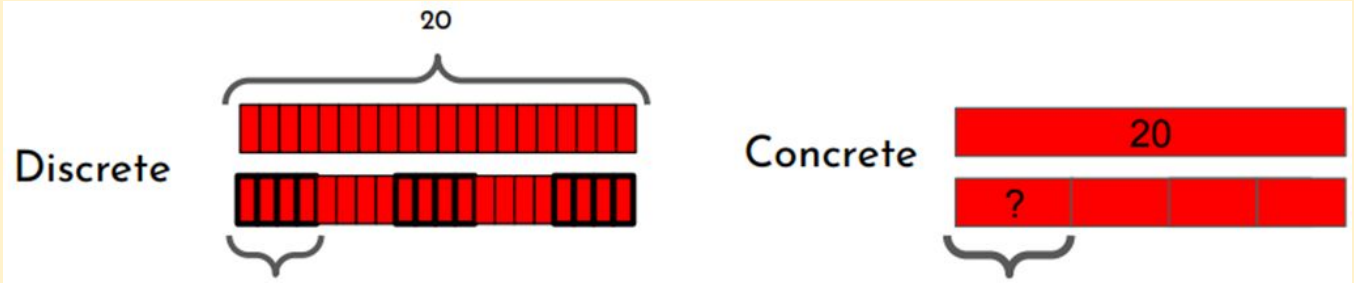








Grouping or Quotative

Spirit Federation

Key Stage 1

Keywords share group equally lots of

Quotative

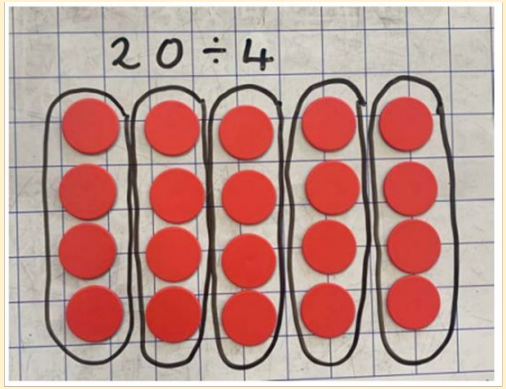


Word problem - grouping

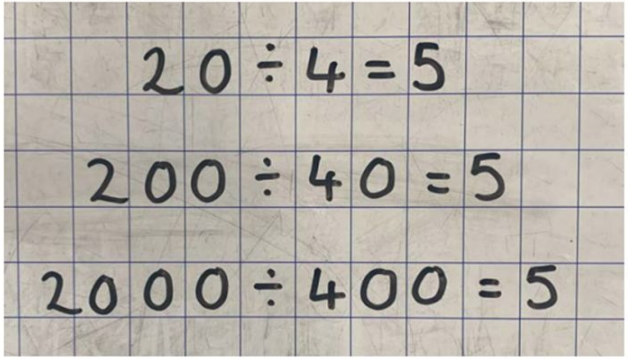
Jennifer had 20 stickers leftover.

She gave out her stickers in groups of 4.

How many groups were there?



Constant Ratio



Key Stage 1

Keywords share group equally lots of

Quotative



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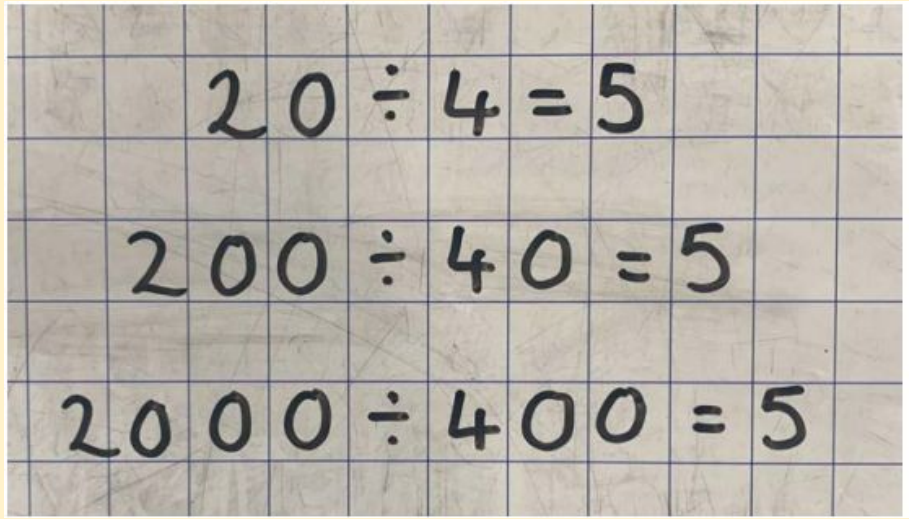


Key Stage 2

Keywords share group equally

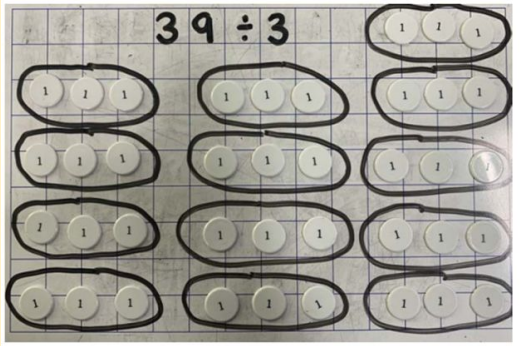


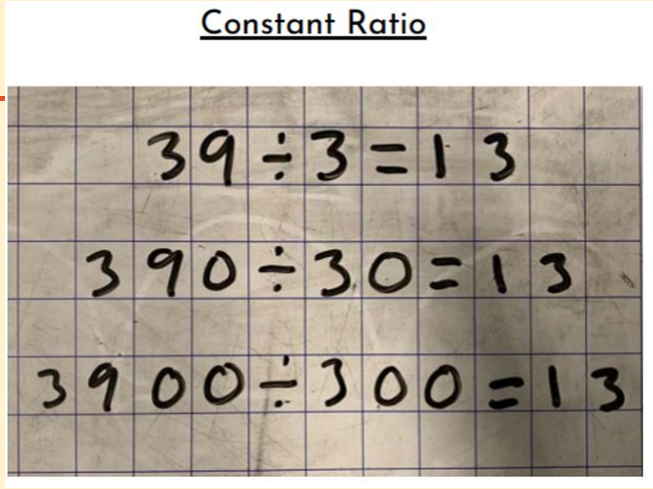
Word problem - group

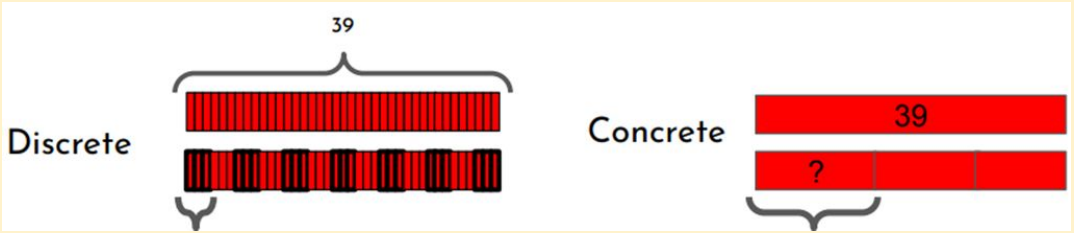
Mohammed was in charge of the 39 crayons in the class tray.

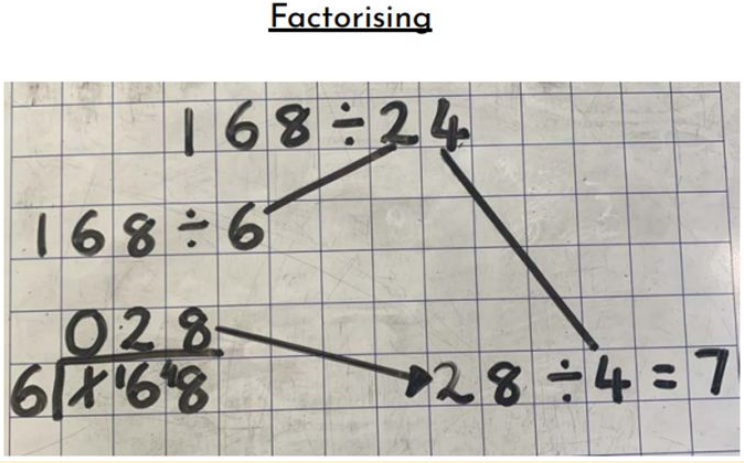
He grouped the crayons into boxes of 3.

How many boxes did he use?









Key Stage 2 Keywords share group equally lots of

Quotative



Word problem - group

Mohammed was in charge of the 39 crayons in the class tray.

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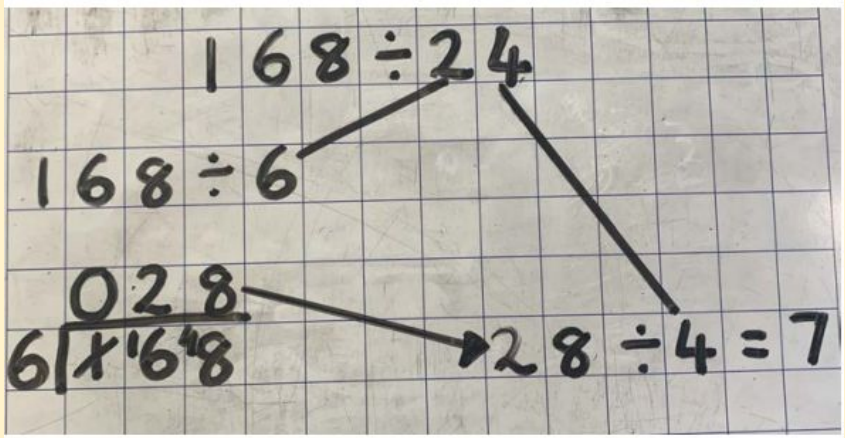
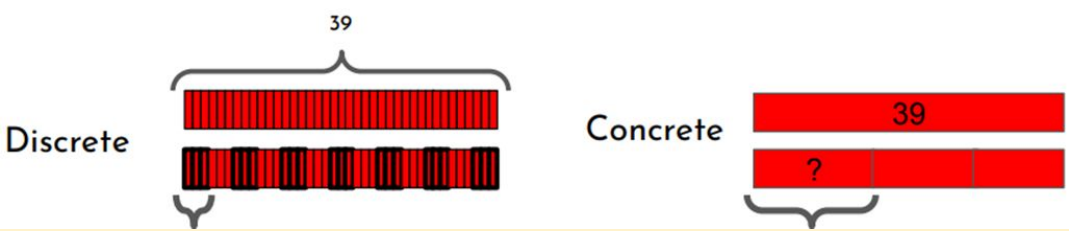
Factorising

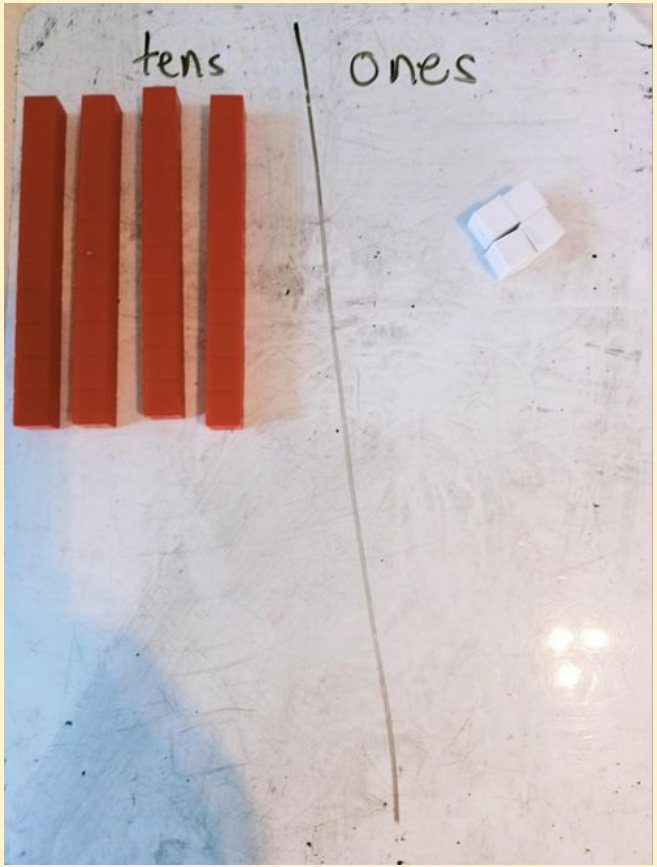




Manipulatives

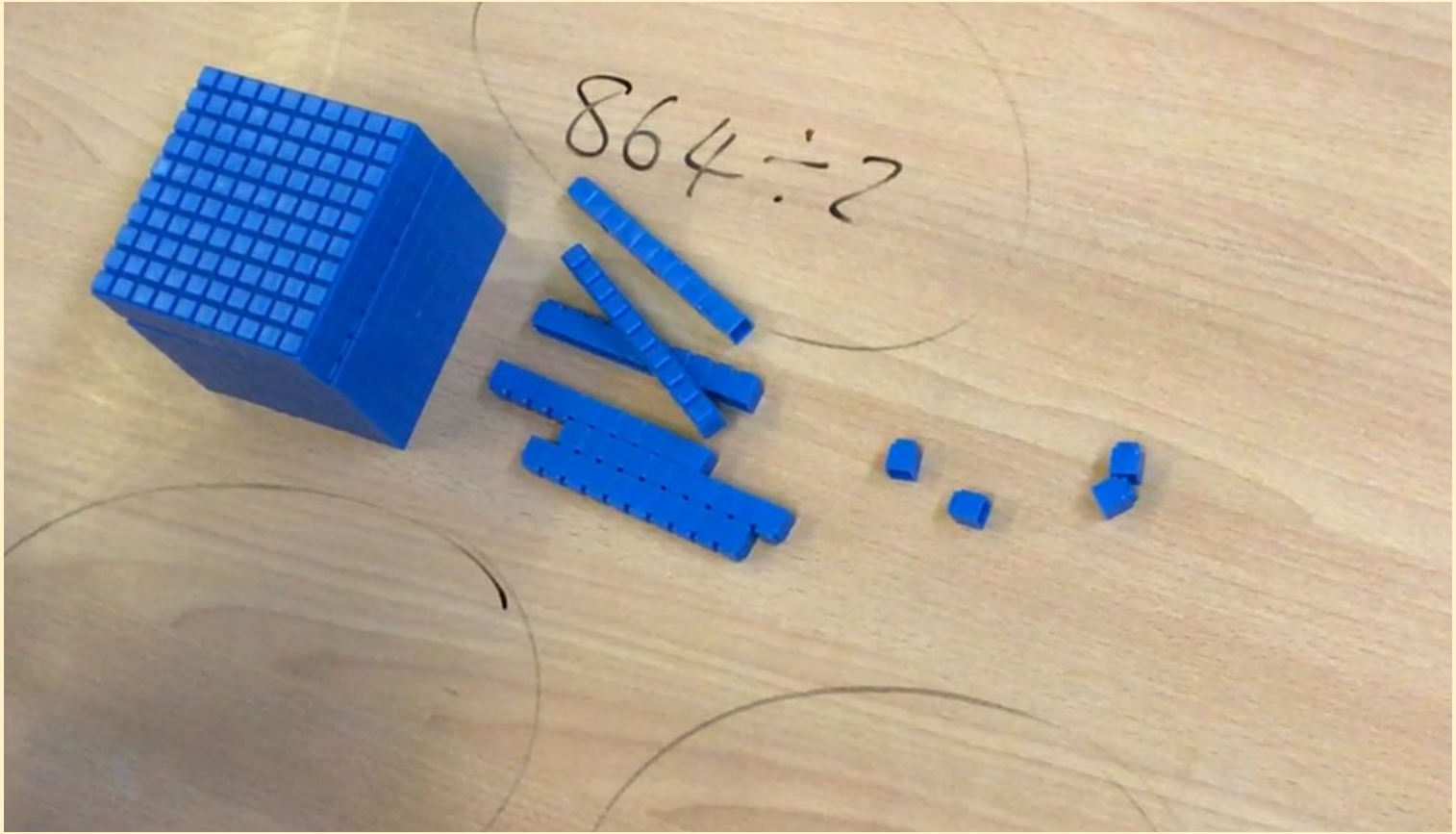
Spirit Federation

Key stage 1

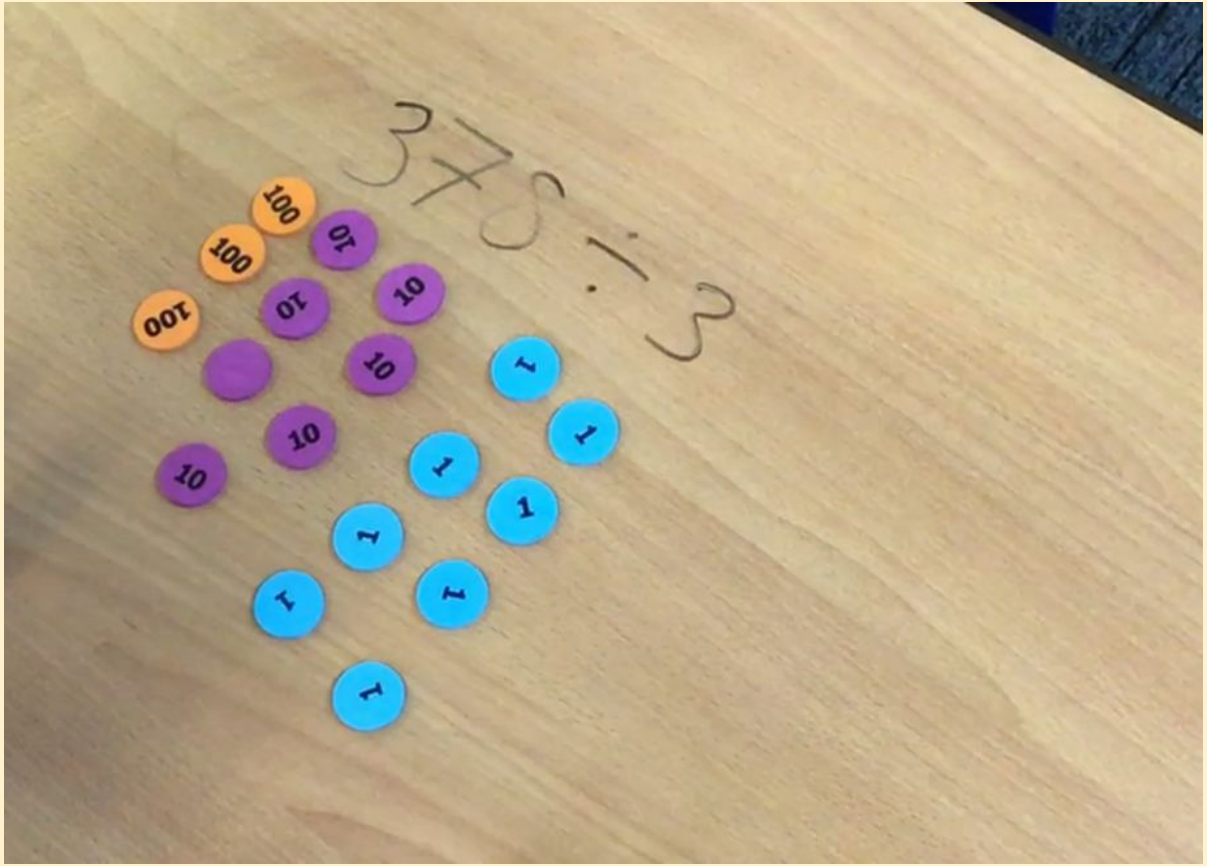




Key stage 2



Key stage 2

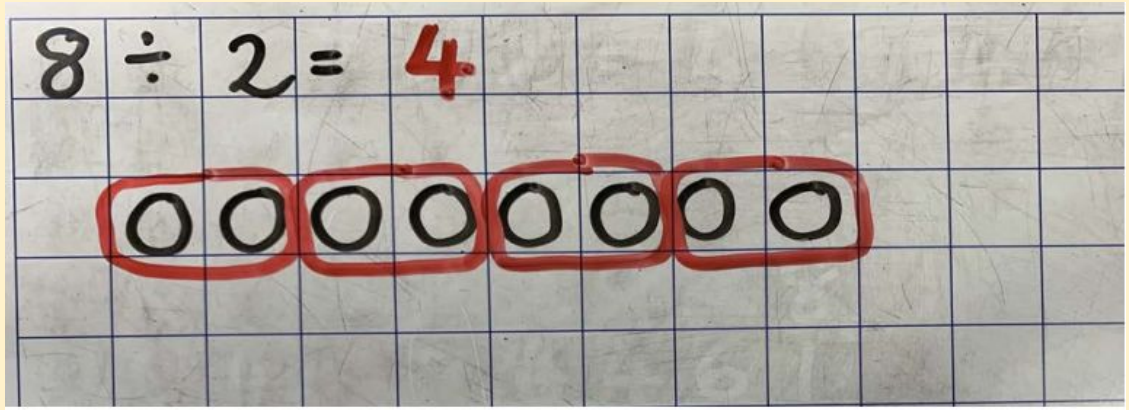


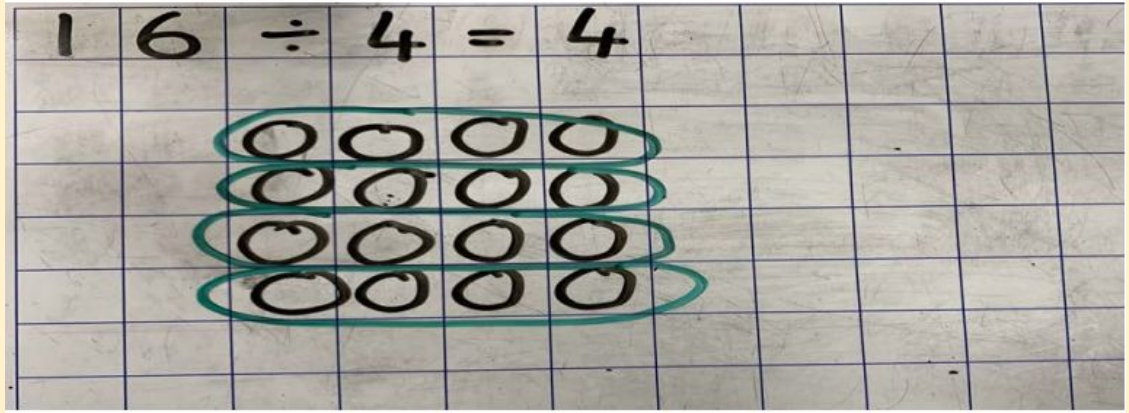
Progression of written methods

Spirit Federation

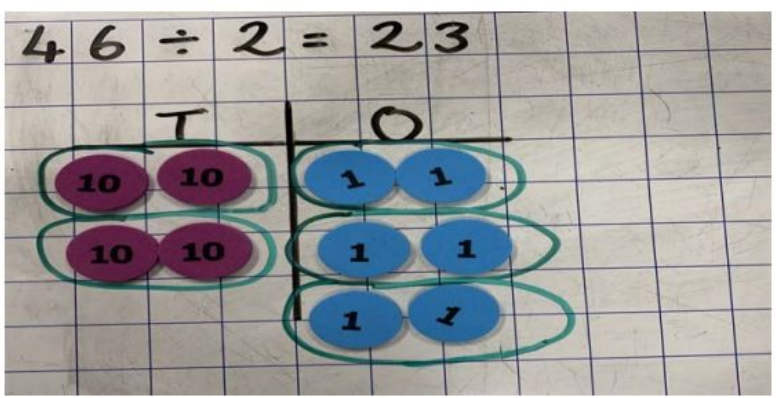
Arrays

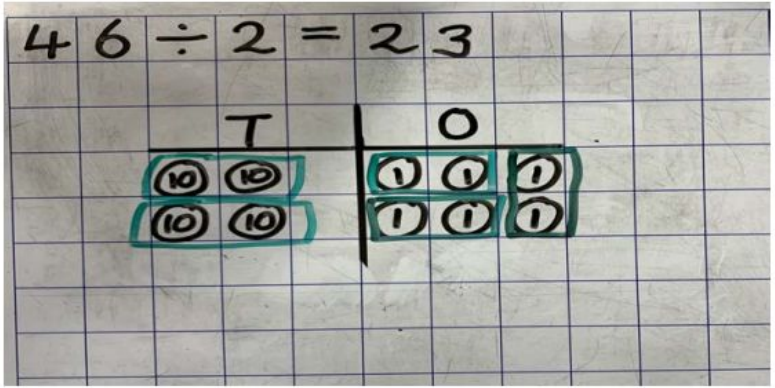
Vocabulary:
4 groups of 2





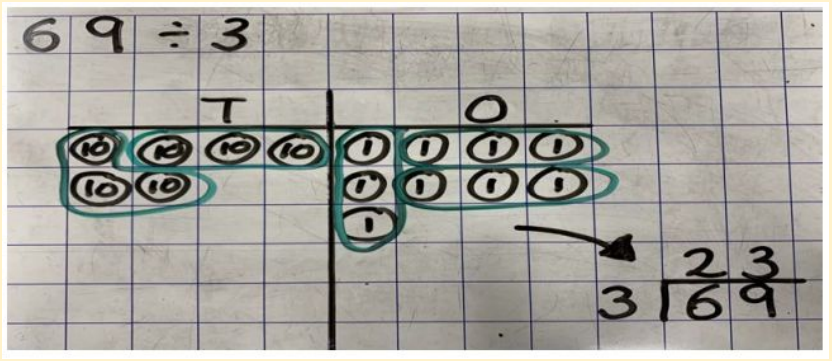
Grid



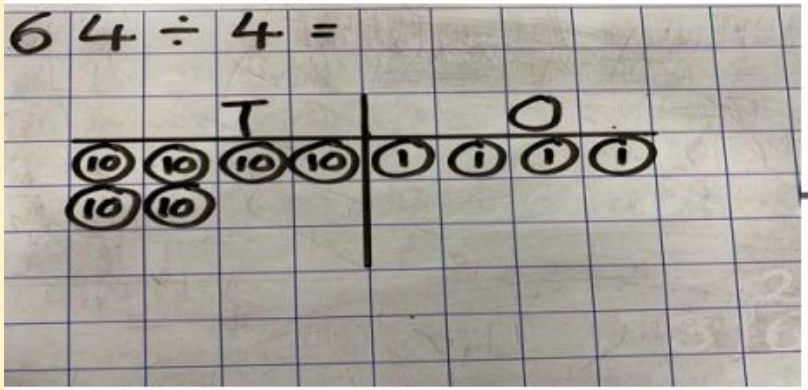


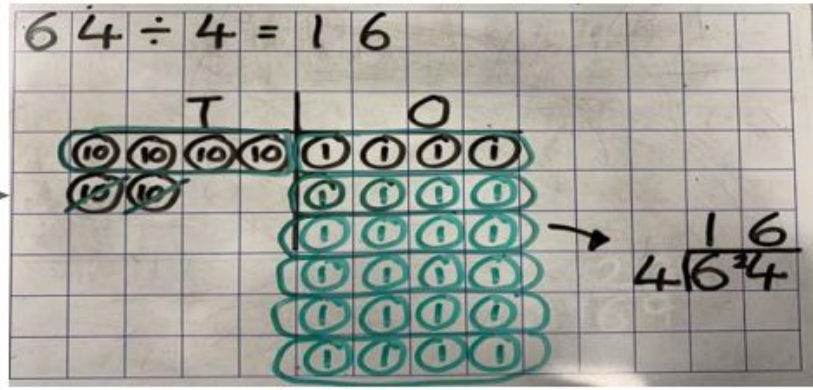
Grid to short division (no remainders)

No exchange



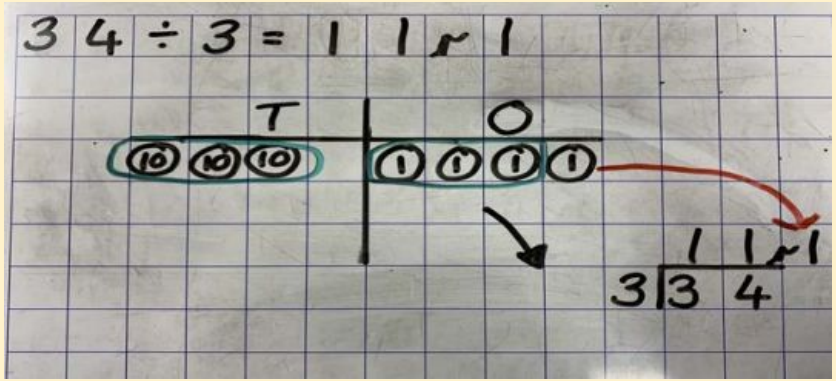
With exchange



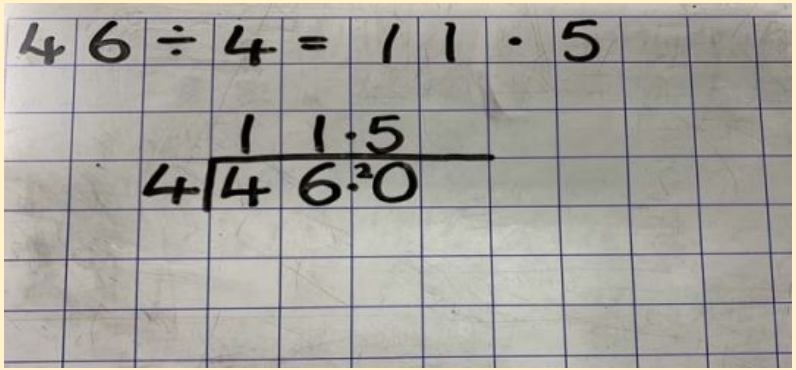


Grid to short division (with remainders)

Remainders as whole numbers

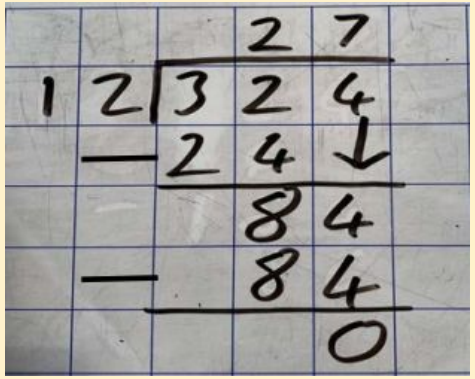


Remainders as a decimal

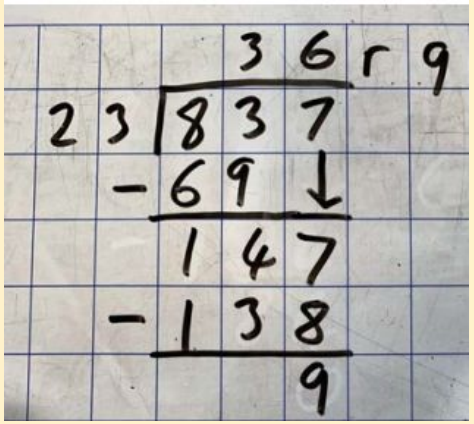


Long Division

Without remainders



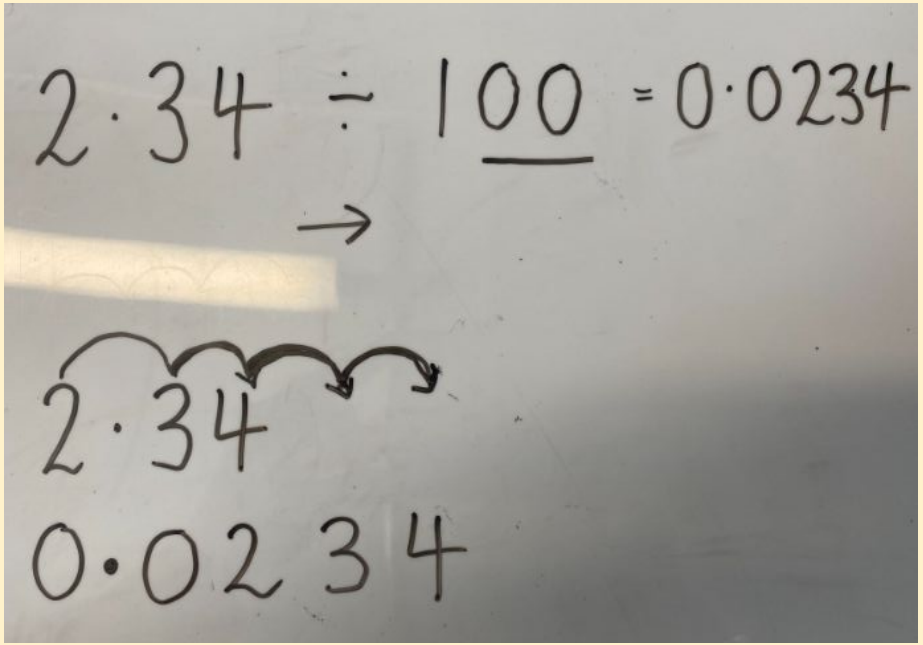
With remainders



Dividing by powers of 10

The decimal point **does not** move.

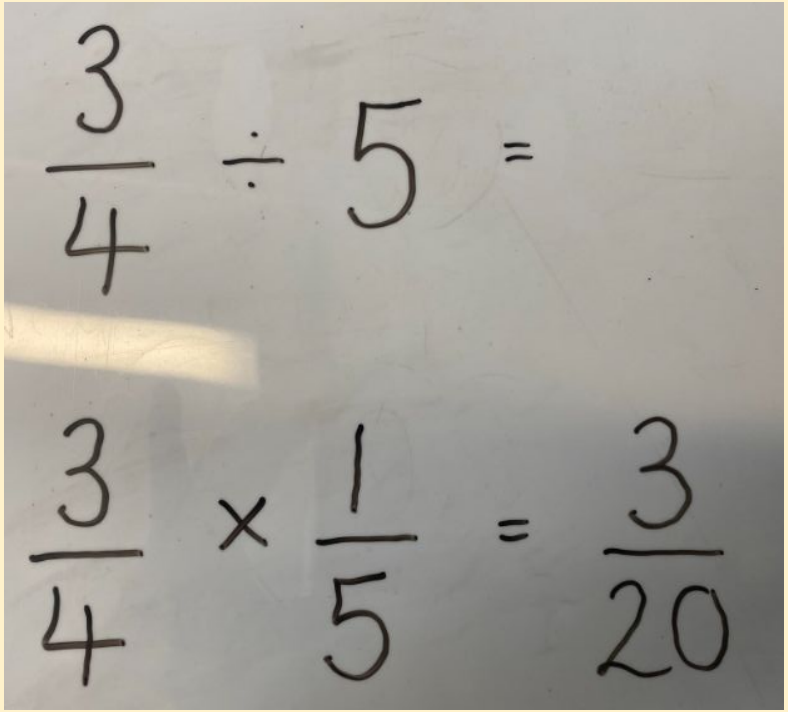
Count the 0's and move each digit the same number of place value places to the right.



Dividing fractions

Dividing by an integer is the same as multiplying by its reciprocal (1 over the integer).

Multiply as usual.



Division Manipulatives videos

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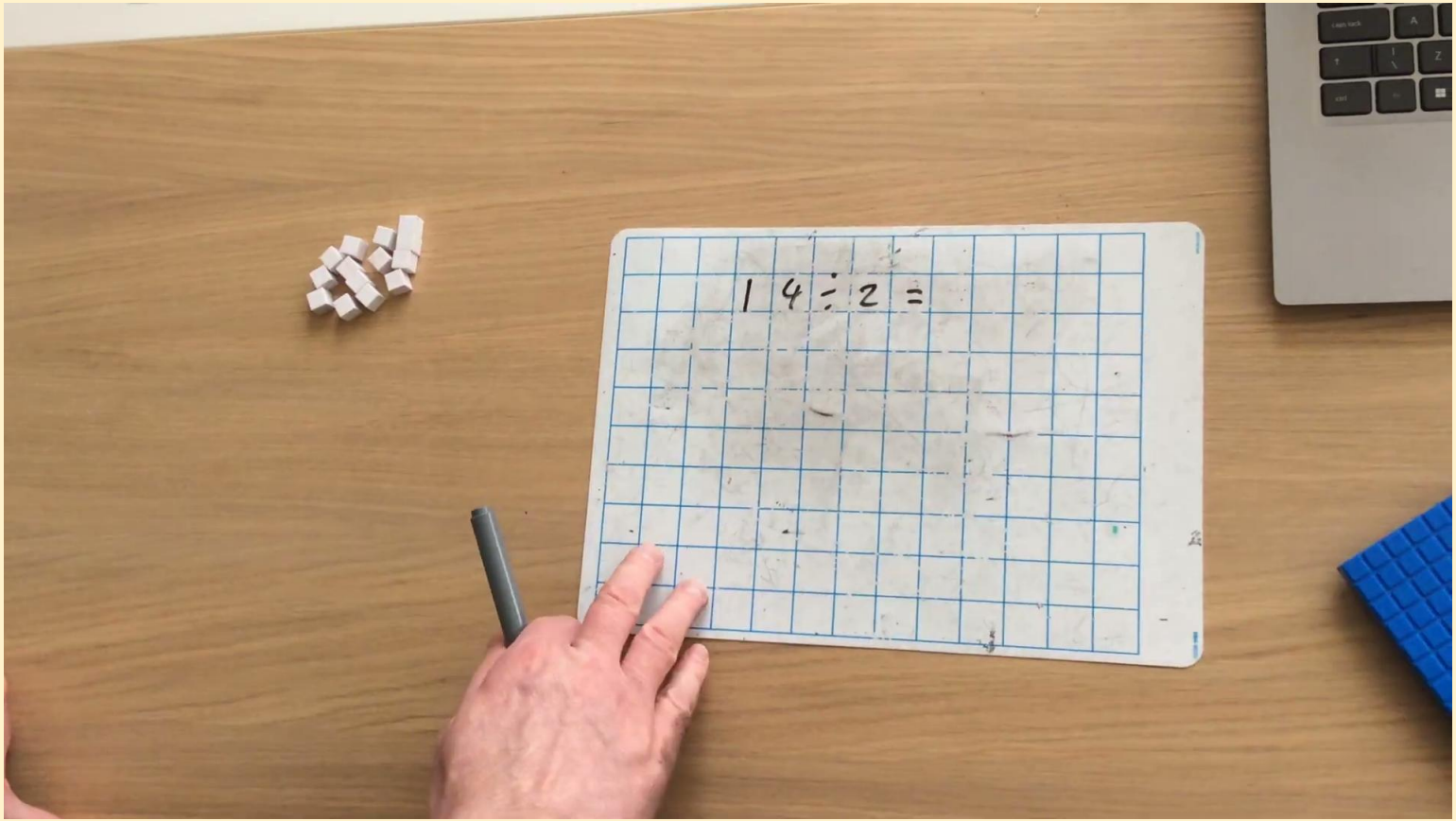
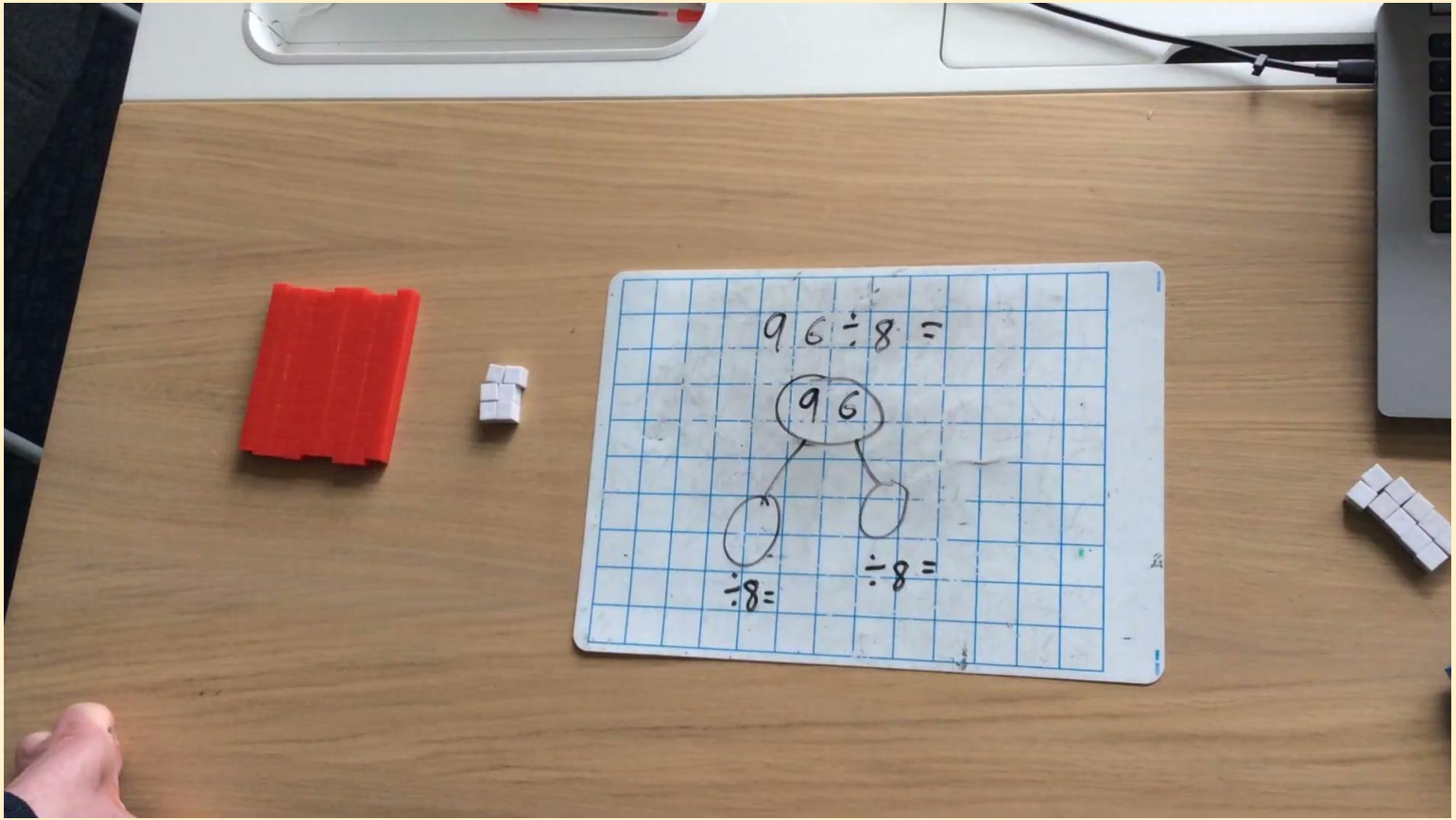
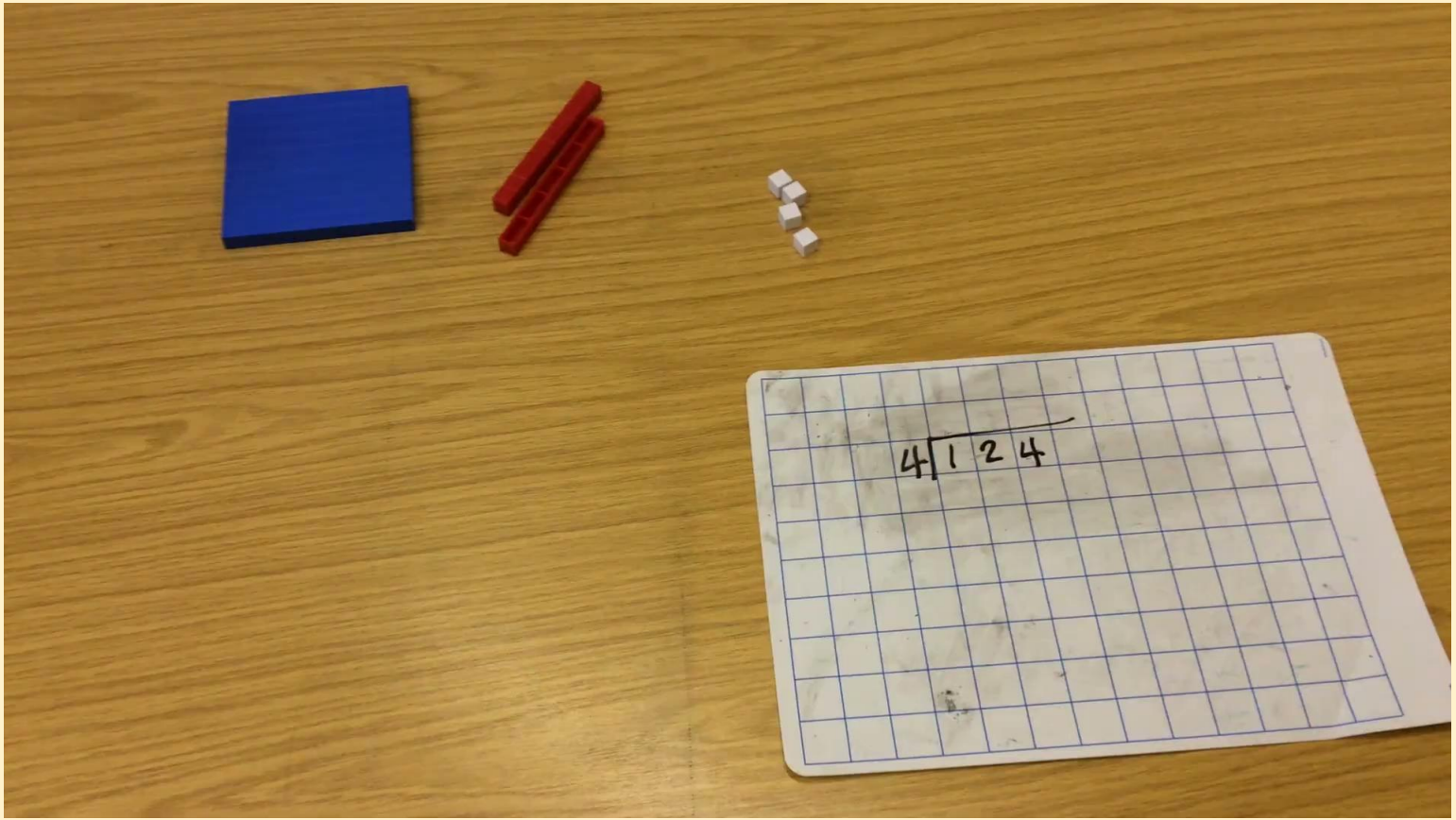
Division halving



Division 2 digit by 1 digit



Division 3 digits by 1 digit



Key terms and definitions

Spirit Federation

Key Terms

Associativity

The associative law says that when we add or multiply numbers, it doesn't matter how we group them (which we calculate first).
For example, (7 + 5) + 3 = 7 + (5 + 3) or (4 x 5) x 2 = 4 x (5 x 2)

Commutativity

The commutative law states that addition and multiplication calculations can be carried out with the numbers in any order, whereas for subtraction and division, the numbers must be in a particular order.
For example, 8 x 9 = 72 or 9 x 8 = 72

Compensation

The deeper understanding that there are multiple ways to generate a sum to make a simpler problem to solve.
For example, 278 + 203 = (278 + 200) + 3

Key Terms

Constant Difference

Constant difference refers to the idea that the difference between two numbers does not change after adding or subtracting the same quantity to both numbers.

For example, 134 - 98 = 136 - 100

Constant Ratio

Constant ratio refers to the scaling of the dividend and divisor by the same number, with the answer then always remaining the same.

For example, 12 ➗ 3 = 4, 120 ➗ 30 = 4

Distributive

The distributive property states that multiplying a number by a group of numbers added together is the same as doing each multiplication separately.

For example, 5 x (2 x 6) = 5 x 2 + 5 x 6

Key Terms

Doubles and Halves (Division)

Doubles and halves, applicable to division only, is when you double or half both the divisor and the dividend to achieve the same answer.
For example, 72 ➗ 6 = 12, 36 ➗ 3 = 12

Doubles and Halves (Multiplication)

Doubles and halves, applicable to only multiplication, is when you double or half the multiplier and then do the opposite (half it if doubled the multiplier) to the multiplicand to achieve the same answer.
For example, 20 x 6 = 120, 10 x 12 = 120

Subitising

The strategy of seeing a group as a unit without counting.

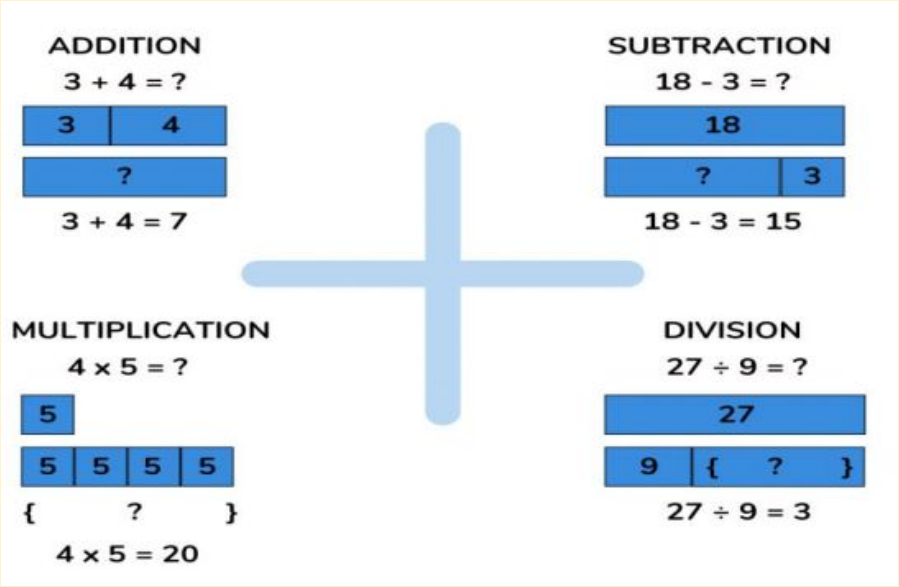
For example,  **= 3**

Appendix

Spirit Federation

Representing questions in various ways

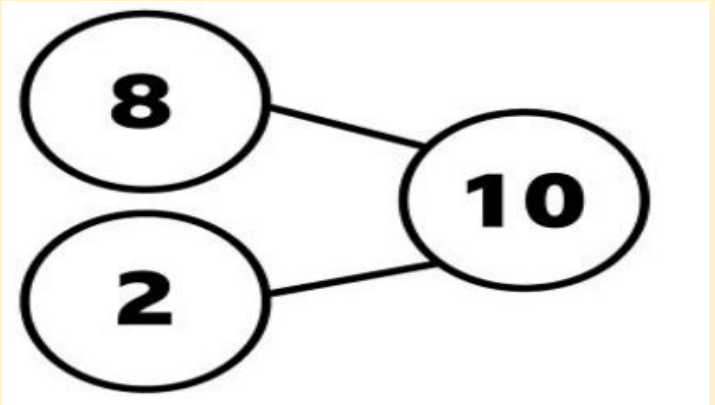
Bar Model



Abstract

$$67 + 25 = 92$$

Part-Whole Model



My 1 to 10 Number Track

1	2	3	4	5	6	7	8	9	10

My 1 to 10 Number Track

1	2	3	4	5	6	7	8	9	10

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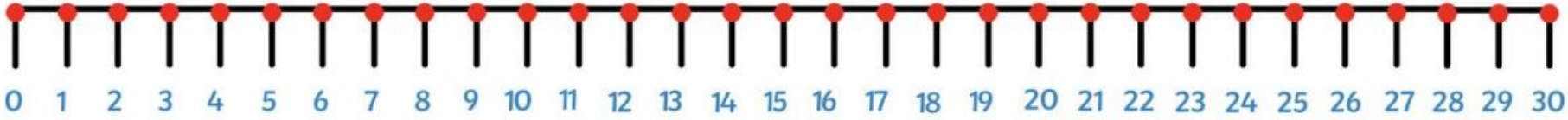
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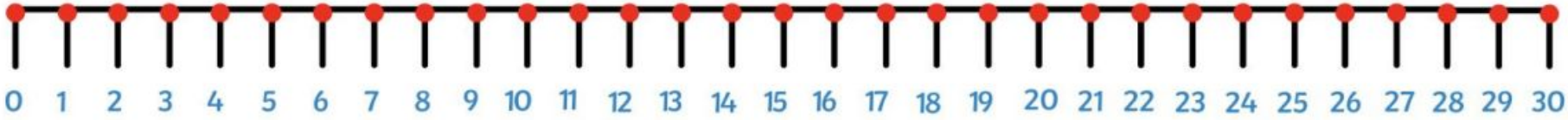
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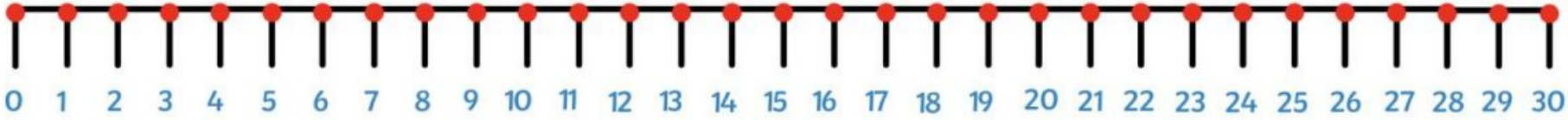
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Rounding

Underline the place value you are rounding to and circle the *significant digit* - the next digit in the adjacent column to the right.

This *significant digit* tells you whether to round up or down.

0,1,2,3,4 the underlined digit stays the same.

5,6,7,8,9 the underlined digit increases by 1.

