Maths Mastery at Northleaze.

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Aims

- The National Curriculum – how is it different?
- A mastery approach – what does this actually mean?
- Maths at Northleaze – what does this look like?
- Maths at home – how can you help?
- Questions.

The National Curriculum – how it is different?

Children should:

- Become **fluent** in the fundamentals of mathematics, including through **varied and frequent practice with increasingly complex problems over time**, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **Reason mathematically** by following a line of **enquiry**, **conjecturing** relationships, making **generalisations** and **developing** an argument, **justification** or **proof** using mathematical language.
- **Solve problems** by **applying** their mathematics to a variety of problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

The National Curriculum – how it is different?

- The new curriculum has considerably higher expectations for children in KS1 and KS2 than it did before.
- The expectation is that the majority of pupils will move through the programme of study at broadly the same pace.
- KPIs (key performance indicators) are followed for each year group.
- To be working at the expected standard children will have to be able to 'Master' objectives for their year group.
- KPIs were handed out at the last parents evening (please see your class teacher if you did not receive/have lost a copy).

A Mastery Approach – **why** was it developed?

- Teaching has been focused on procedures rather than deep understanding.
- There are increasingly large gaps in specific areas of learning.
- Fluency and quick recall of key facts was not secure.
- Negative attitudes towards maths ability and enjoyment from both children and parents.

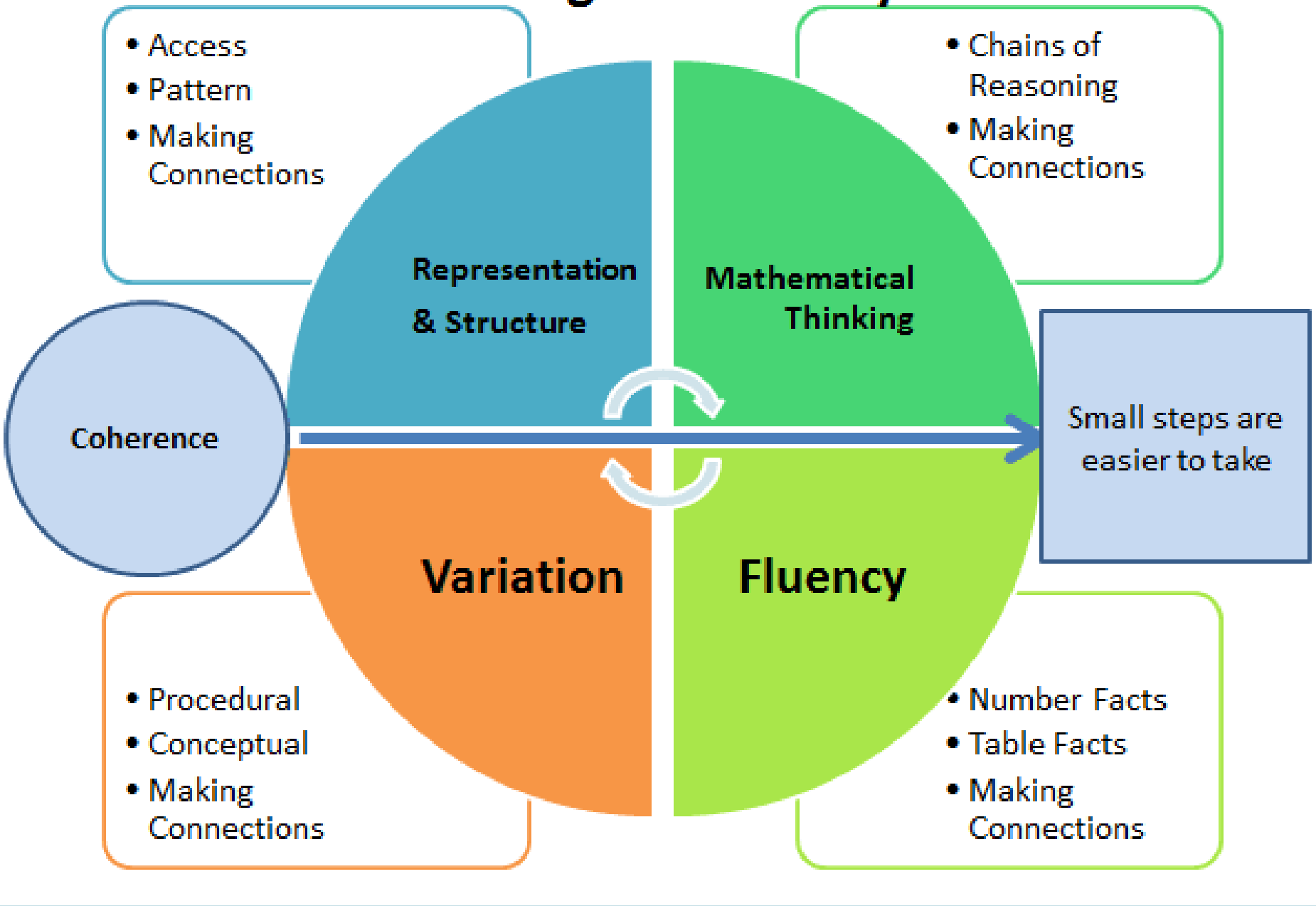
A Mastery Approach – **what** does this mean?

- **Rejects** the idea that some people ***'just can't do maths'***. Instead encourages the belief that everyone can do maths!
- Whole class interactive teaching with all pupils working on the same lesson content for the same time.
- Longer time spent on key topics, e.g.: number, place value, four operations (+ - x ÷).
- Concrete and pictorial representations are used to help children grasp new ideas and to build knowledge of how and why maths procedures work.
- Developing fluency and variation to enable pupils to make links between learning.

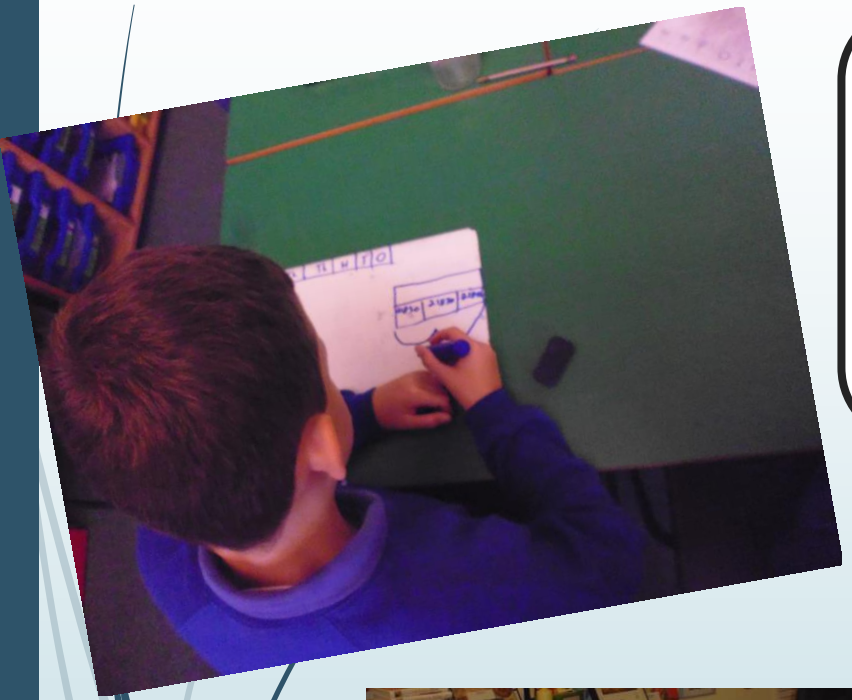
A Mastery Approach – **what** does this mean?

- Pupils master concepts before moving to the next part of the curriculum sequence, allowing no pupil to be left behind.
- Early intervention to ensure pupils **keep up (not catch up).**
- Lesson design focuses on small steps through a carefully sequenced learning journey.
- Hinge questions used during lesson time to inform type of intervention required.
- Rapid graspers are challenged through deepening their understanding rather than using bigger numbers as well as applying their knowledge to a variation of problems (see examples on the table).
- Those working significantly below are supported with KPIs from earlier year groups as well as same day and next day interventions.

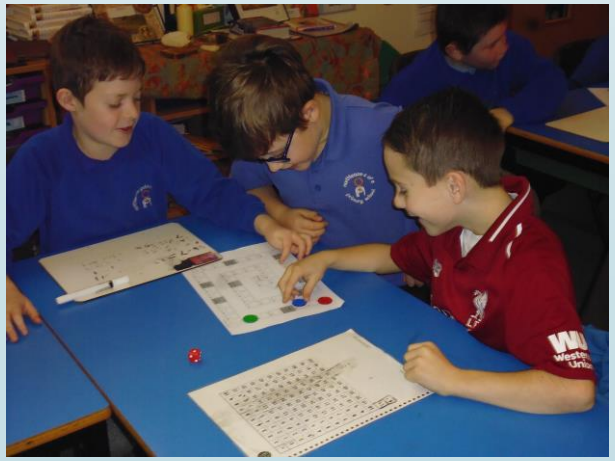
Teaching for Mastery



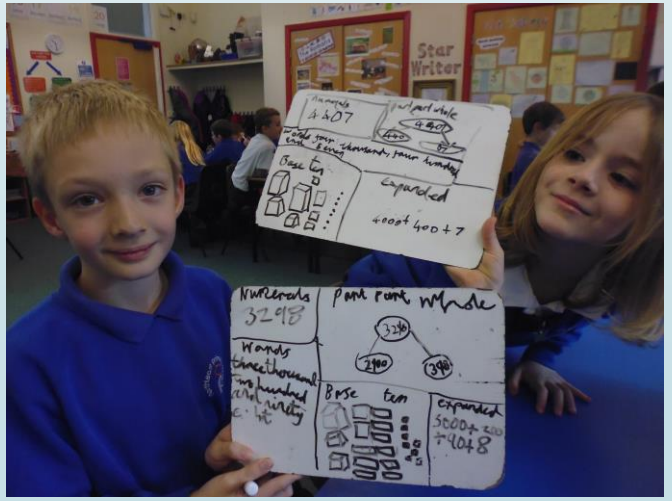
Maths at Northleaze



By using concrete materials we can explore why maths procedures work.



We work in partners to share our learning and our ideas. It is useful as it means we can use our initiative to solve mathematical problems.



Hinge questions…

Lesson 1
LF: simplifying fractions.

Hinge…

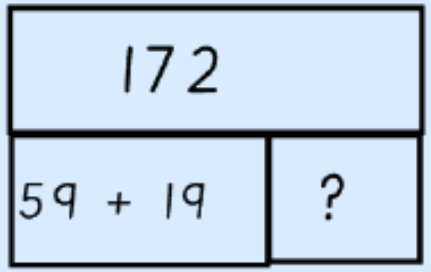
Simplify: $\frac{14}{35}$

A) 7/5
B) 2/5
C) 7/7
D) I don't know…yet!

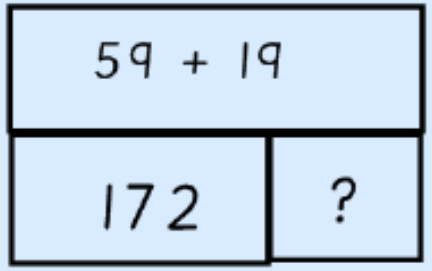
10.10.16
LF: balancing equations

Which PPW model would help you solve 172 - ____ = 59 + 19

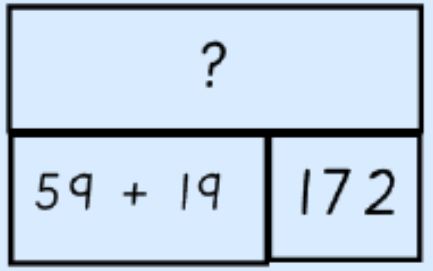
a)



b)



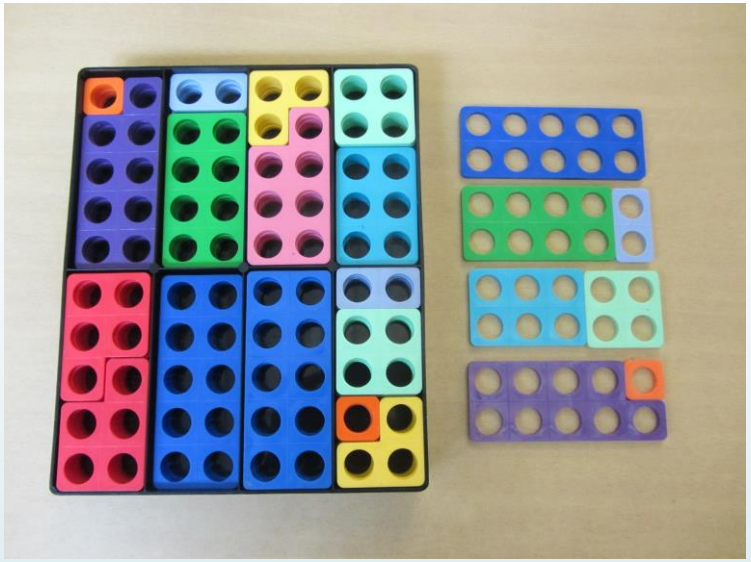
c)

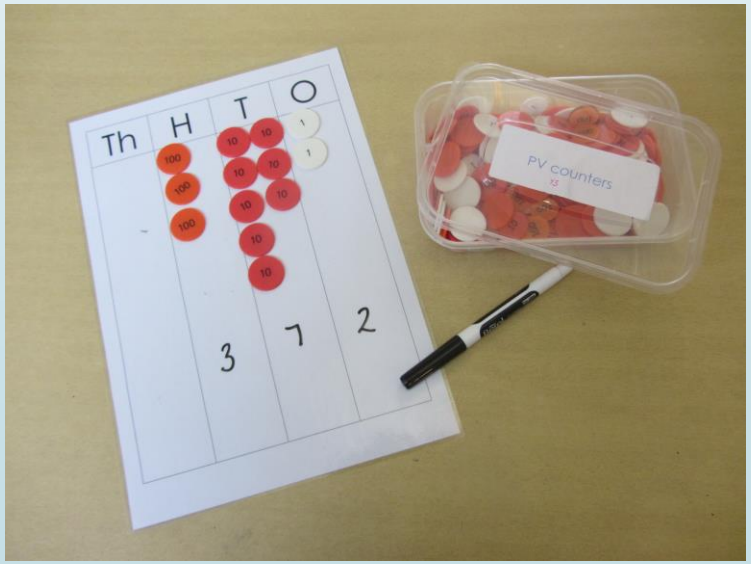


d) Not sure…yet!

Grab boxes

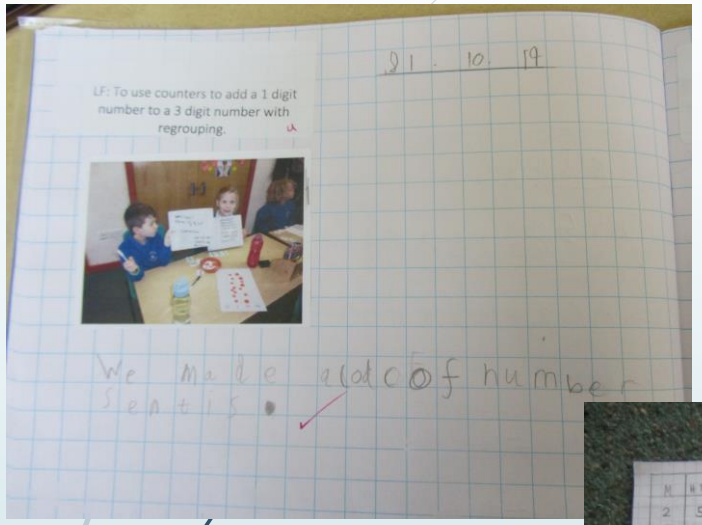

Number fans
Counters
2D shapes
Dice
Bead strings
Year 3

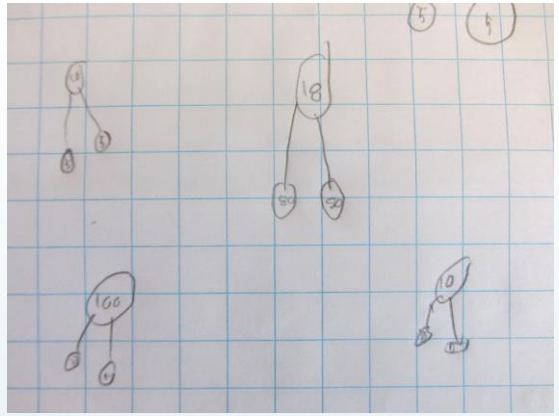


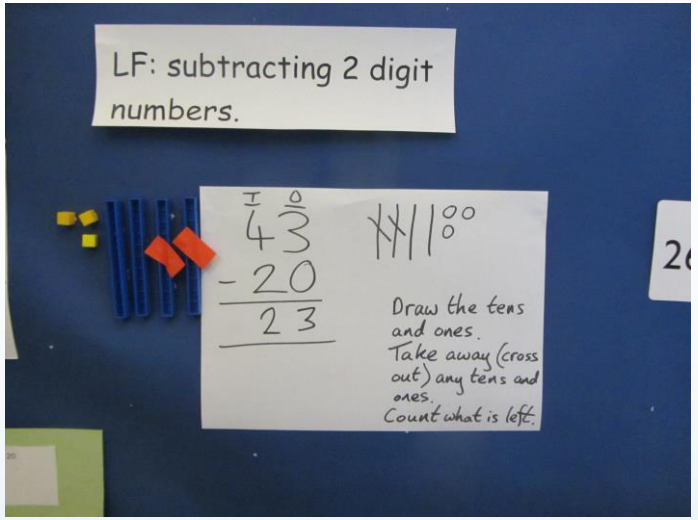

Th
H
T
O
PV counters
3
7
2

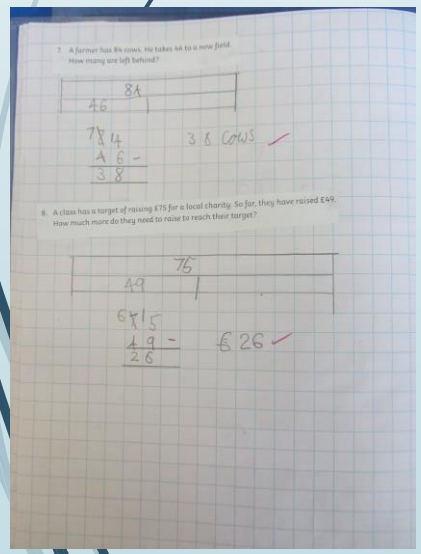

Base 10
(units/rods/flats)

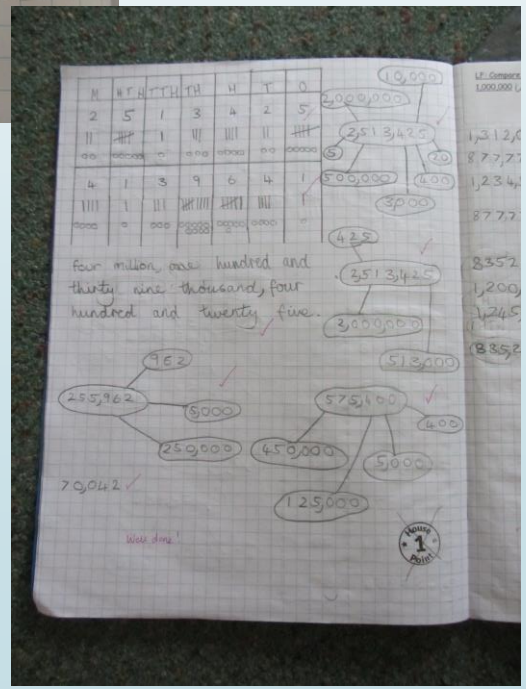
Maths at Northleaze

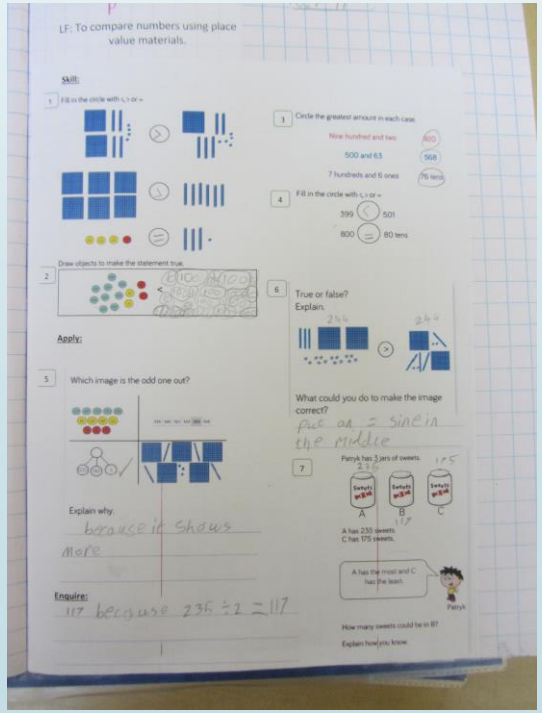


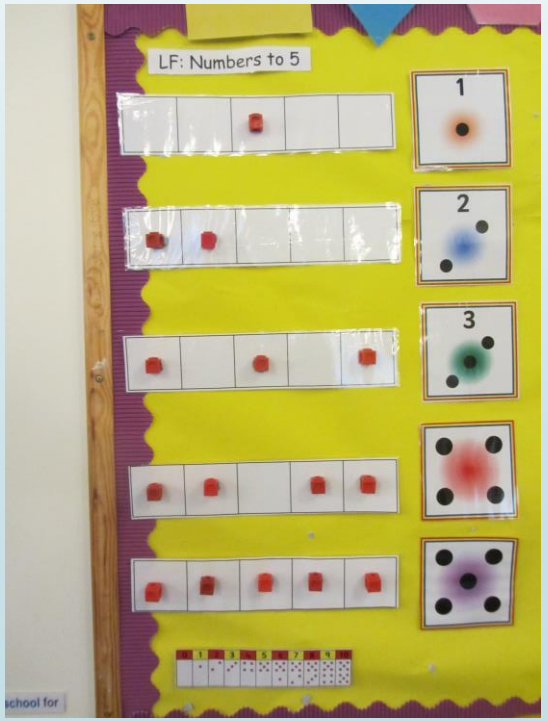












Reasoning and talking mathematically.

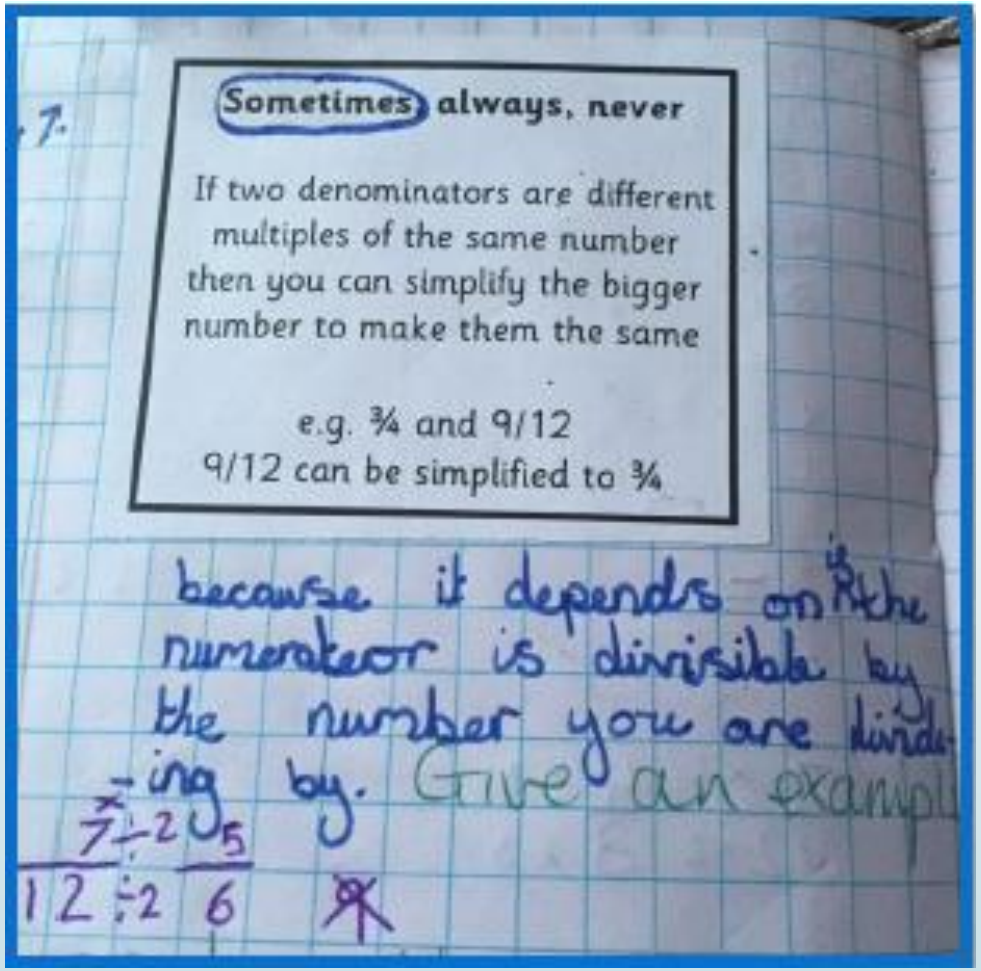
Which is the odd one out? *Why?*

Captain Conjecture says 'The number in the place value grid is the largest 3-digit number you can make using all 10 counters.'

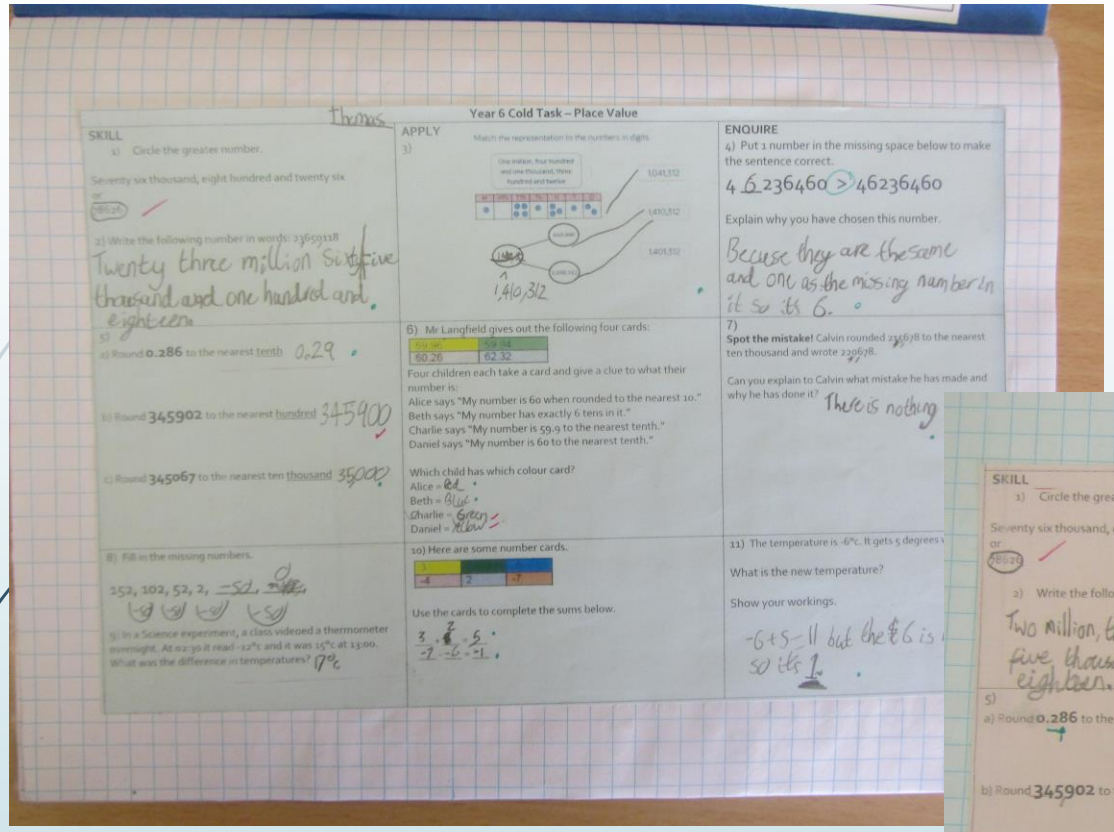
100s	10s	1s
● ● ● ● ● ●	●	●

Do you agree?

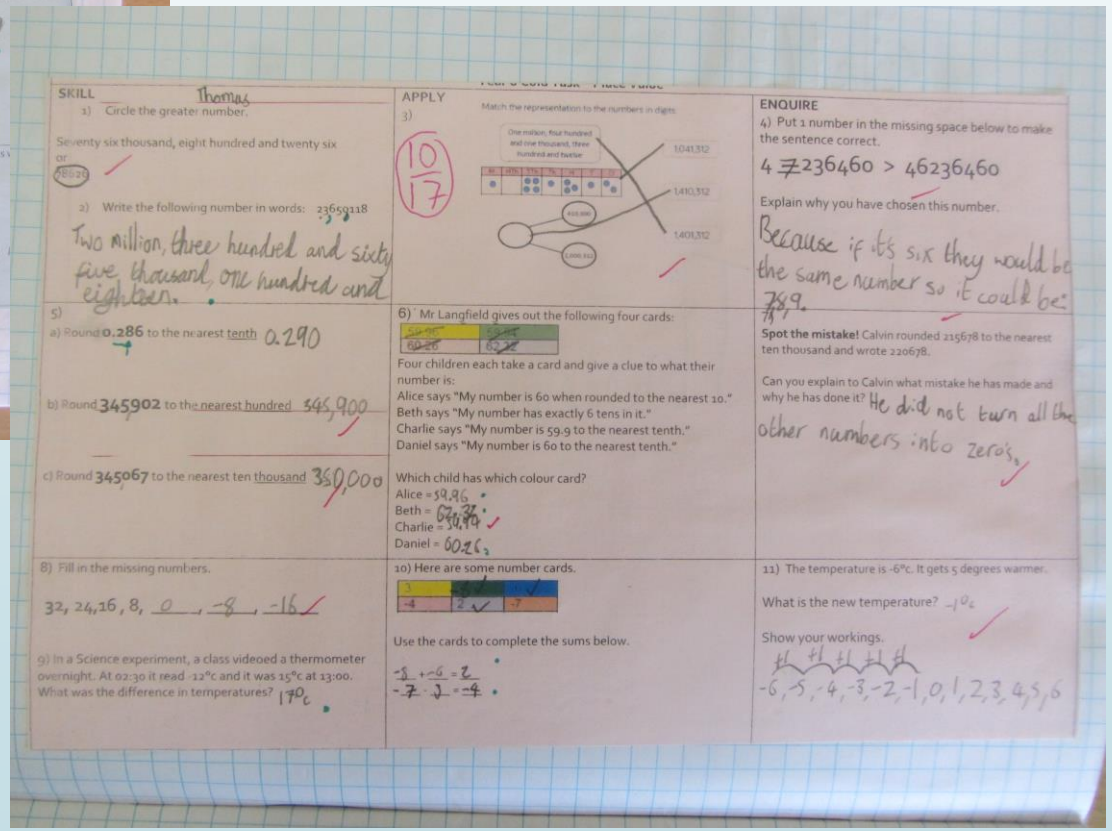
Explain your reasoning.



Cold and hot tasks.



Cold tasks are used to assess prior knowledge and understanding and inform our planning. These are done at the beginning of the unit and completed independently.



Hot tasks are used to assess understanding at the end of a unit. This informs the KPIs and what interventions are necessary.

Maths at home – how can you help?

- Support your child with their maths homework where you can.
- Use every opportunity to **ask your child questions** and to encourage them to explain their reasoning to you.
- Continue to work on number facts at home **(number bonds, times tables, making relationships between numbers)** so that your child is fluent in them *(able to recall them out of order.)*
- **Look for maths around you**; telling the time, discussing the days of the week, talking about money, measuring out ingredients, talking about the length of cooking times etc.
- **Play** board/dice/card games with your child at home – encourage counting, mental calculations and talk about strategies and tactics for solving problems.
- **GROWTH MINDSET** – every one of us can master mathematics given the opportunity. Foster an attitude of 'I can', 'I will' and 'I don't know it **yet**, but I'll keep trying!'.

Your turn!

Using manipulatives.

- How could you use the manipulatives on your table to make this number?
- Can you find more than one method?

6753

Using manipulatives.

- Now solve this calculation using the manipulatives…

6753 + 215

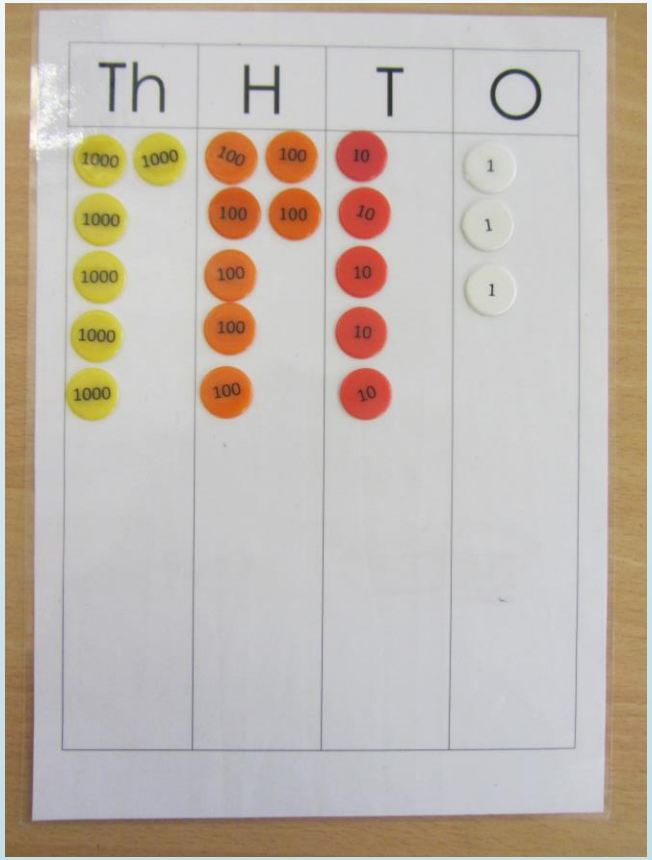
- What would happen if you had to bridge 10? How would the manipulatives help you?

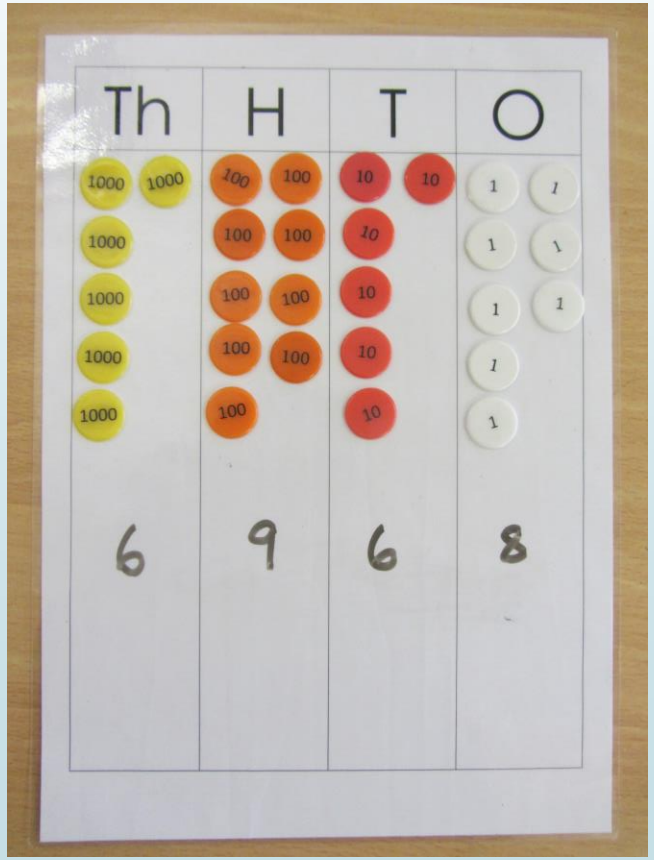
6753 + 515

Using manipulatives.

- What should it look like?

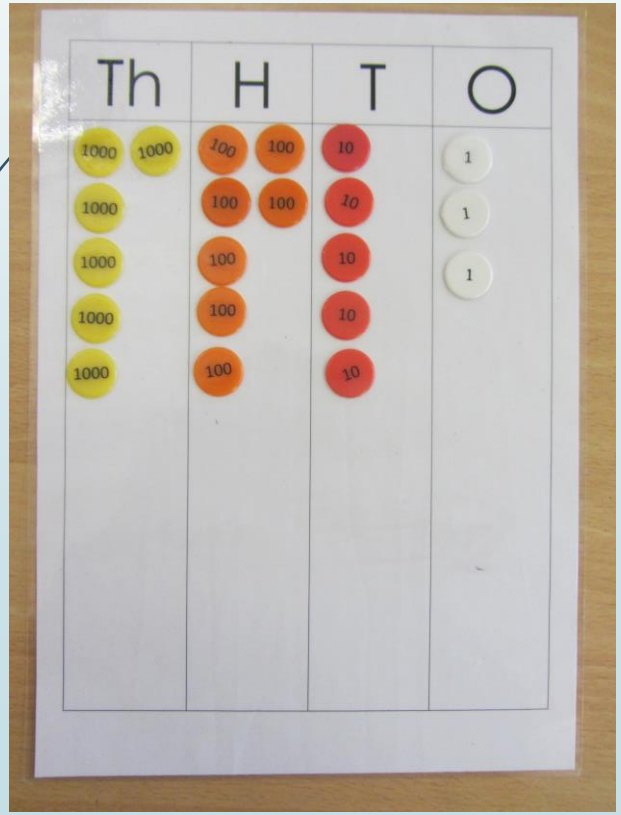
6753 + 215

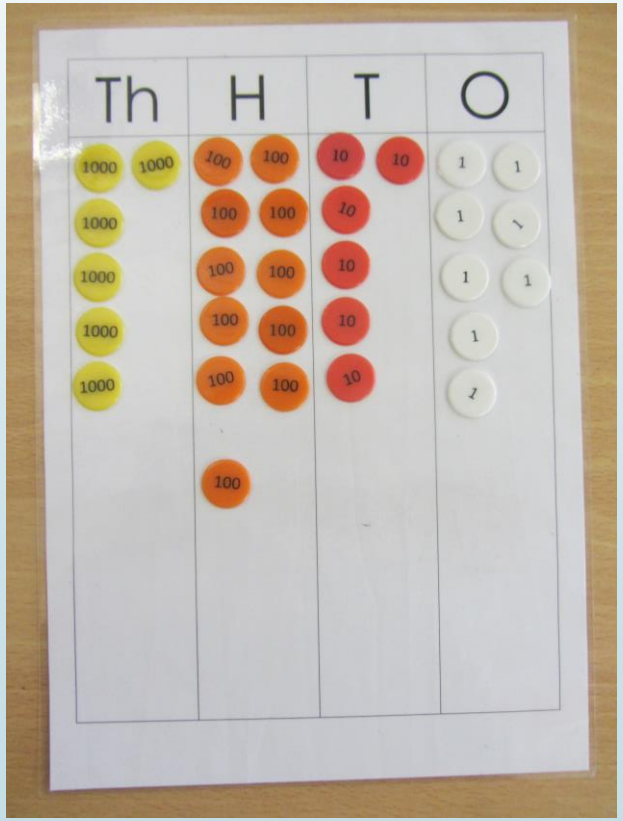


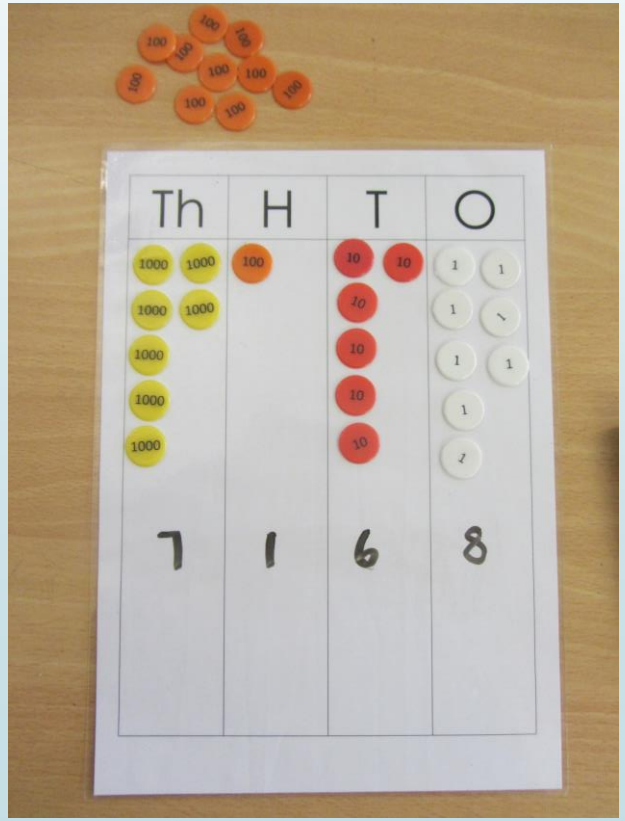


Using manipulatives.

- Bridging 10 – what happens then?







Using manipulatives.

- Now solve this calculation using the manipulatives…

8546 - 1320

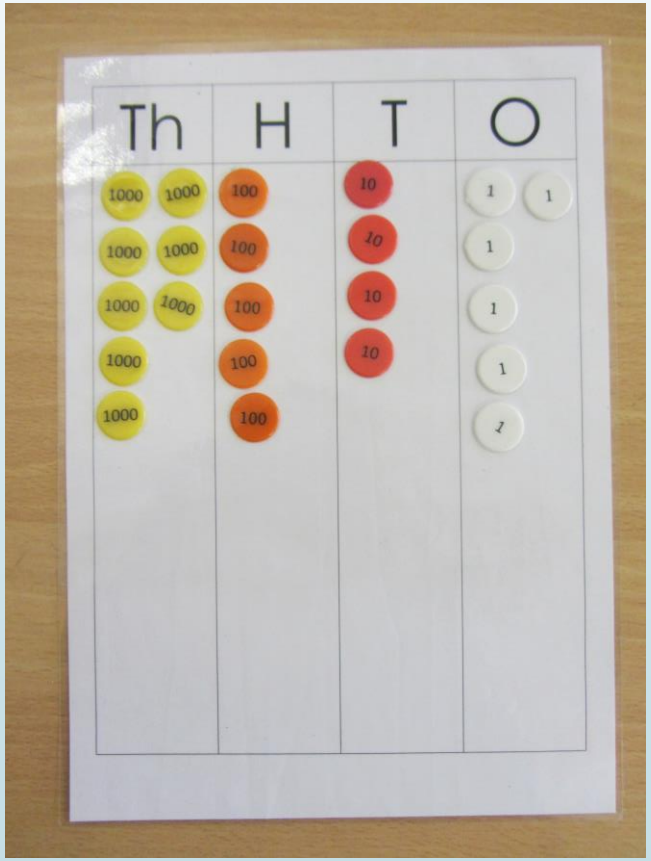
- What would happen if you had to bridge 10? How would the manipulatives help you?

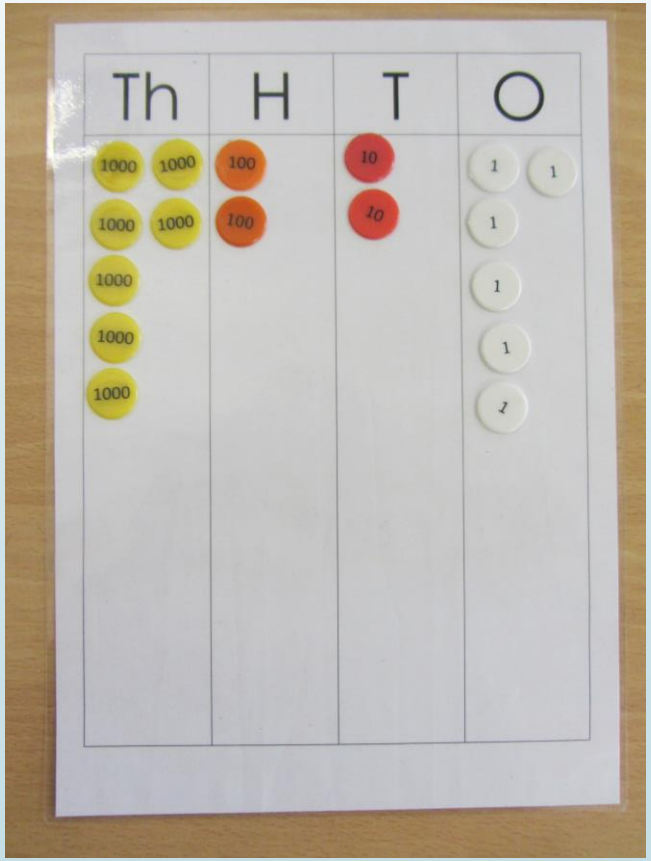
8546 - 1360

Using manipulatives.

- What should this look like?

8546 - 1320

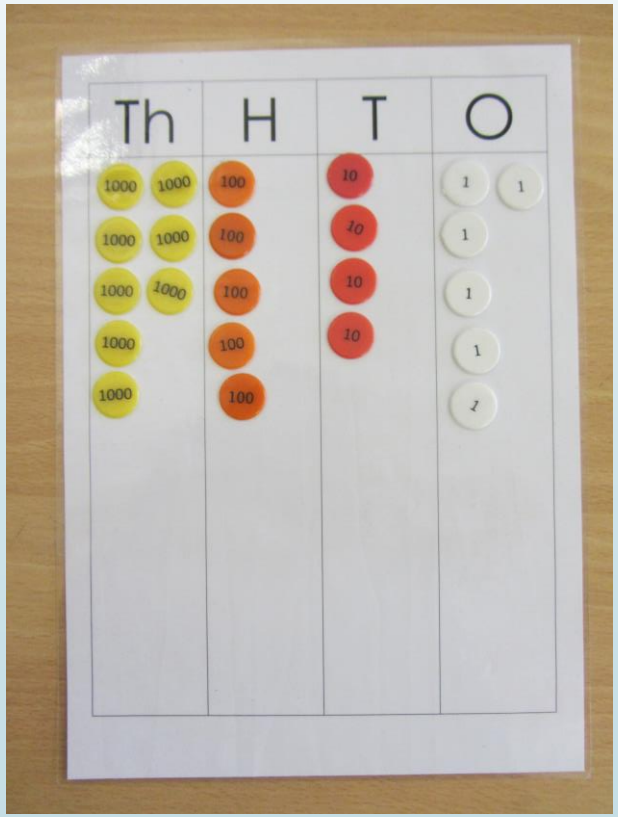


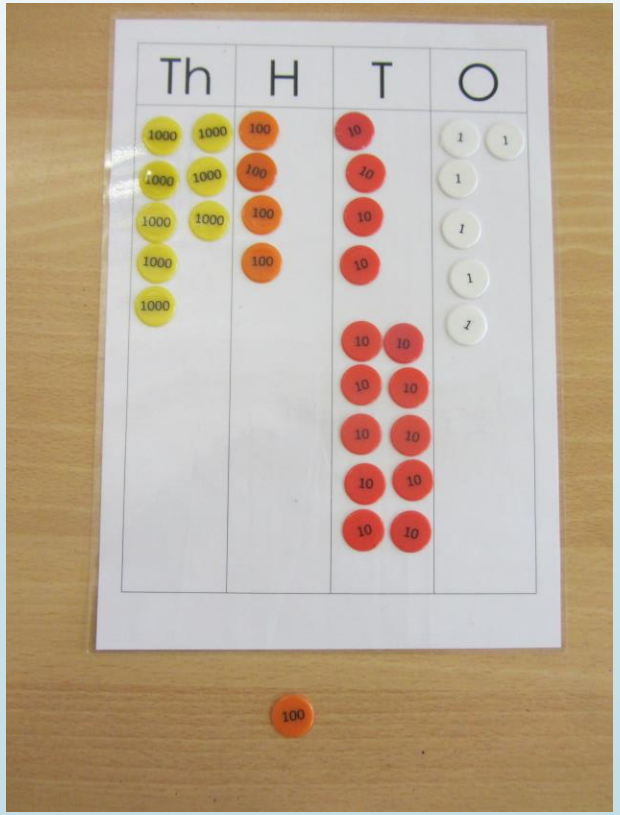


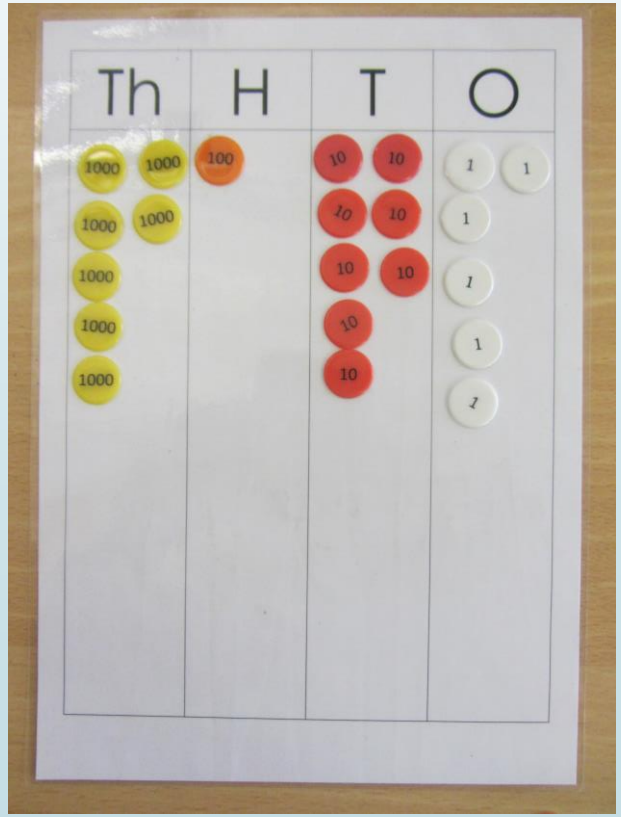
Using manipulatives.

- Bridging 10 – what should this look like?

8546 - 1360







Bar modelling.

1 Eva has 20 counters.

6 of them are red.

The rest are yellow.

How many more yellow than red counters are there?

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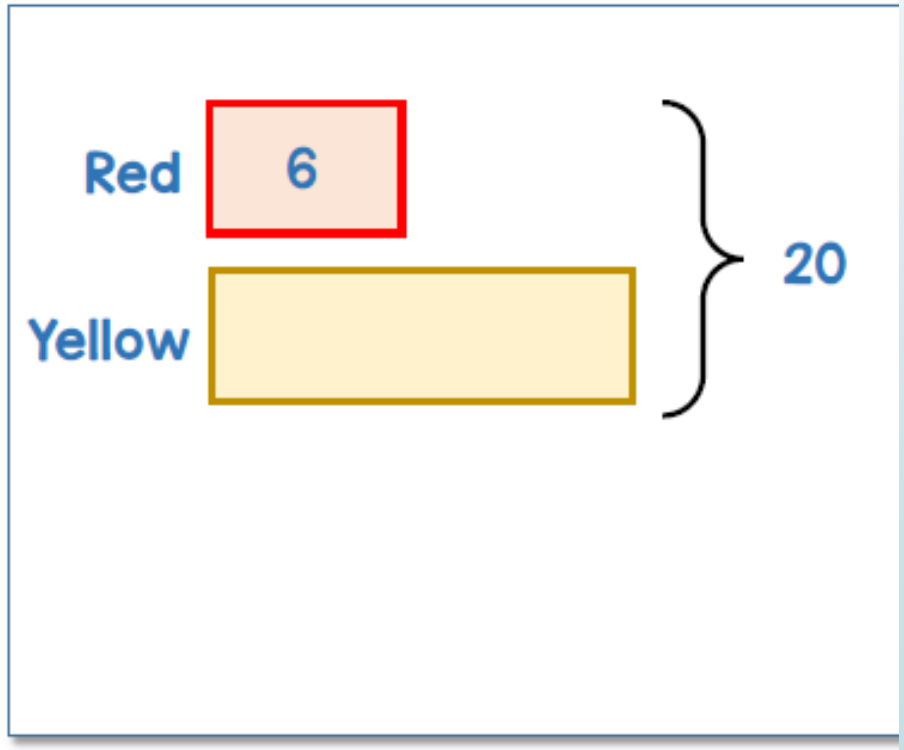

Bar modelling.

3 A baker sold 93 more pies on Tuesday than Monday.
She sold 55 fewer pies on Tuesday than on Wednesday.
She sold 236 pies on Tuesday.
How many pies did she sell in total?

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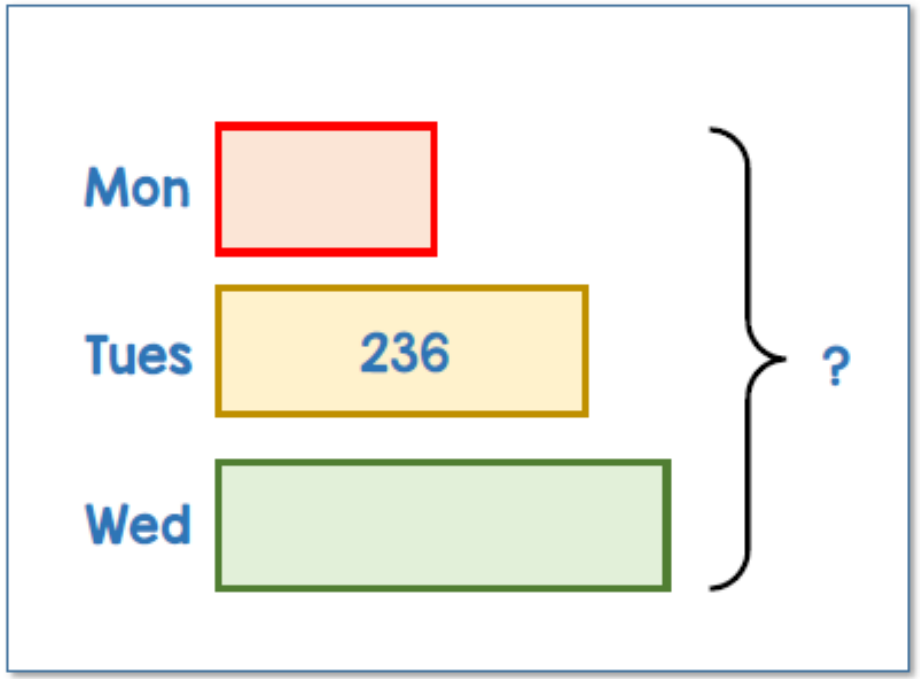

Bar modelling.

3 A box of 8 chocolates weighs 450 g.

Peter eats 3 of the chocolates.

The box of chocolates now weighs 336 g.

How much does the empty box weigh?

Bar modelling.

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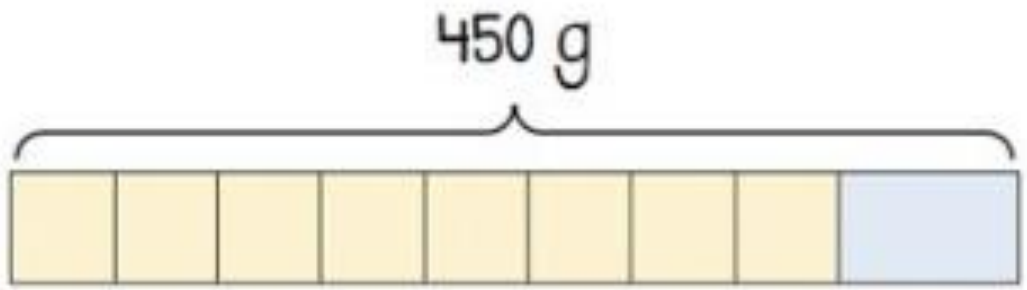
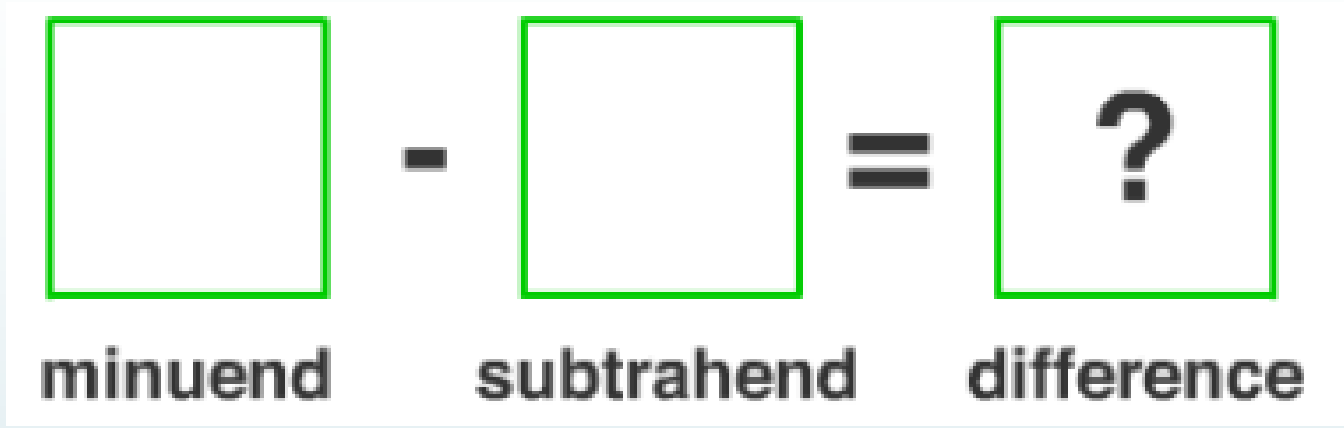
How much does the empty box weigh?

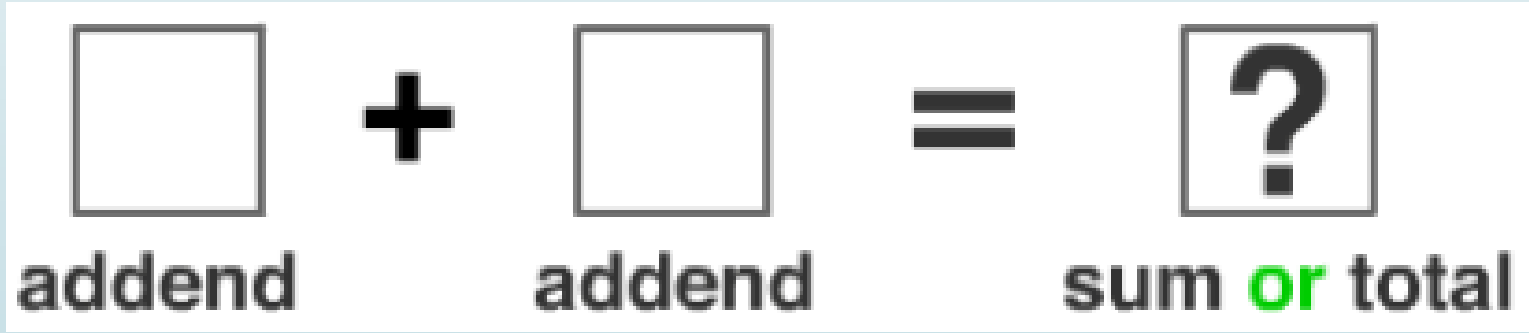


Vocabulary

- Subtraction language:

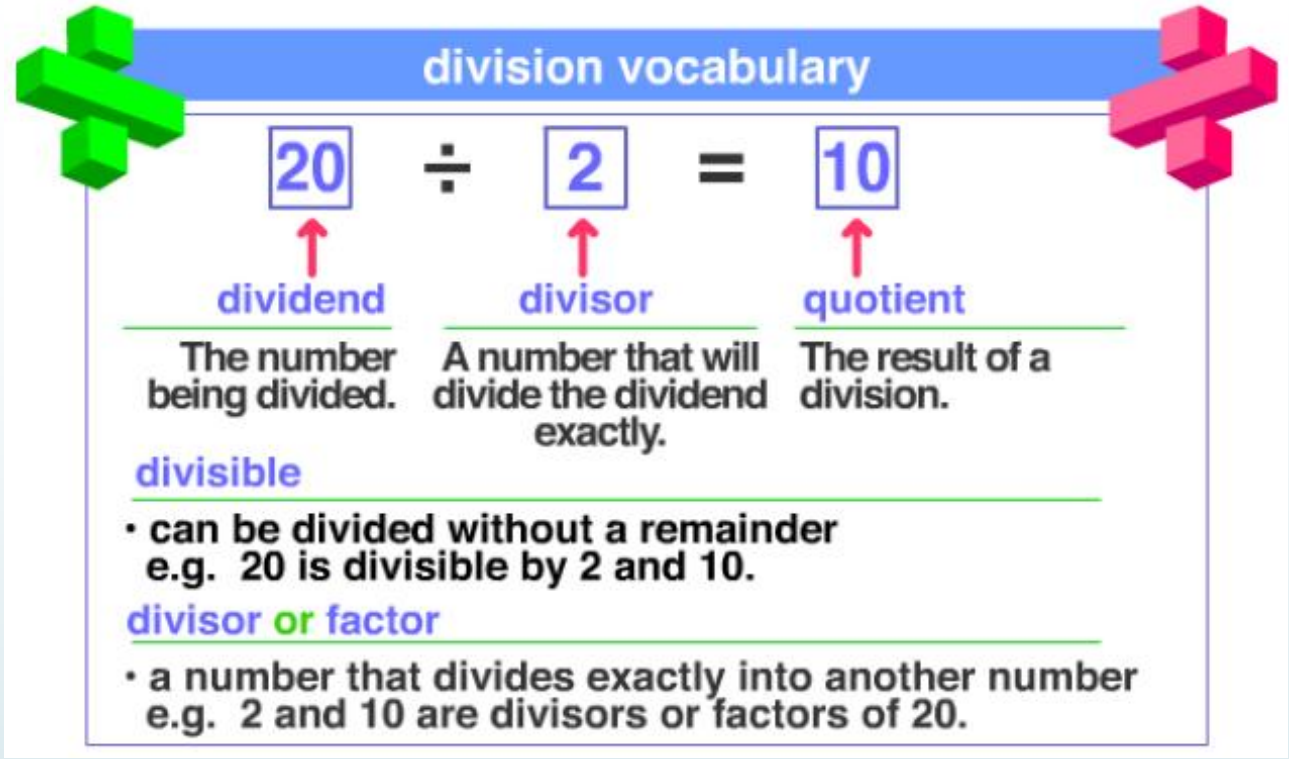


- Addition language:

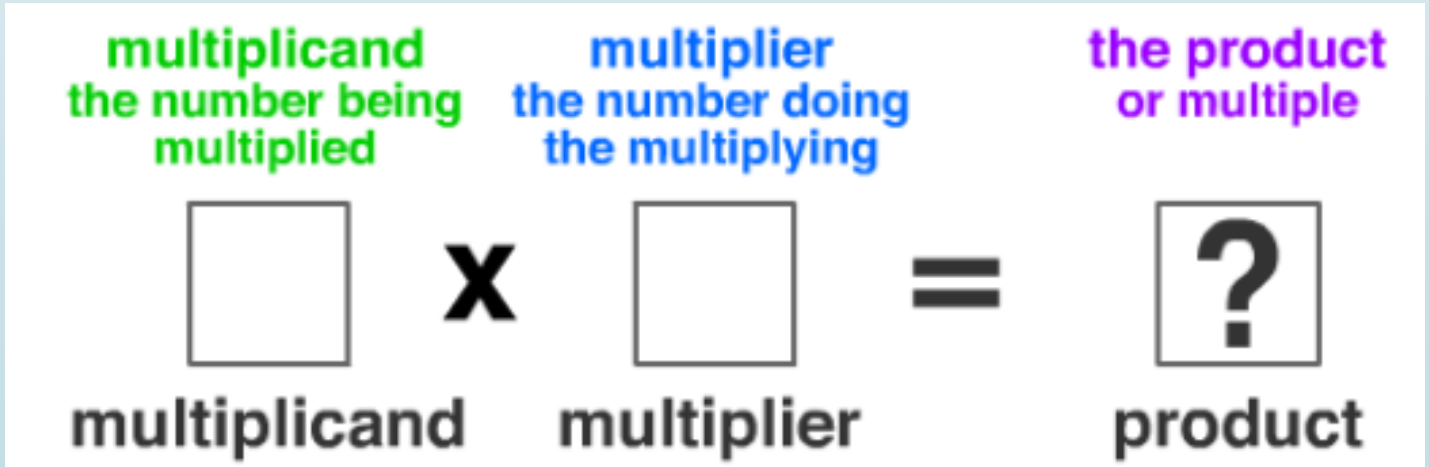


Vocabulary

- Division language:



- Multiplication language:



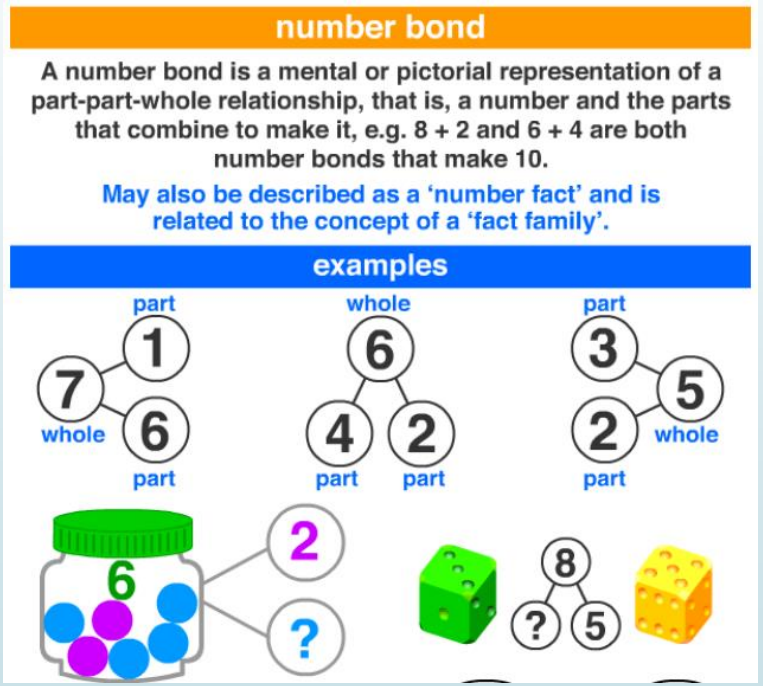
Vocabulary

- Place value – refers the value of the individual digit (HTO)
- Sum – refers only to addition calculations.
- Product – the answer when two integers are multiplied together.
- Integer – a number that can be either positive, negative or zero, but **not** a fraction or decimal.
- Commutative – when a calculation can be written in any order and still result in the same answer (addition and multiplication)
  - e.g.: 2 + 4 = 6 and 4 + 2 = 6
  - 6 x 5 = 30 and 5 x 6 = 30
- Carroll diagram:

Carroll diagram	an even number	not an even number
a multiple of 3	6, 18, 24	9, 21, 27
not a multiple of 3	10, 20, 40	25, 35, 55

Vocabulary

- Fraction: $\frac{\text{numerator}}{\text{denominator}}$
- LCM – lowest common multiple
- HCF – highest common factor
- Number bond:



- Please refer to this website for other words that may need explaining:
  - http://www.amathsdictionaryforkids.com/qr/qr.html

Any questions?

DoodleMaths

What is it and how does it work?