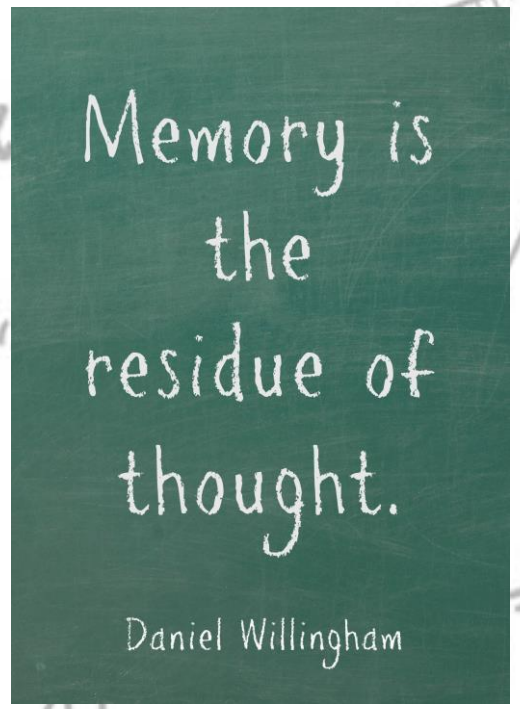
Mathematics at St Mark's



…recall important number and concept facts

…be fluent in number, choosing the most efficient ways to solve problems

…take risks, be resilient and be enthused by challenge

…enjoy their Maths lessons

…feel like they can succeed and make progress

…have a deep and broad understanding of the curriculum

Our aims are for children to…

…be able to apply their knowledge in both Maths and other areas of the curriculum

…be able to reason Mathematically by explaining and proving

…be able to make connections and links between different areas of Maths

…have a secure conceptual understanding of ideas

Our Curriculum

- The National Curriculum is a statutory document which states the objectives for Mathematics however a school can choose how these objectives are taught

- We use ‘White Rose’ planning as a start point for our planning which was devised by a group of leading Maths teachers from around the world. This planning fulfils our school aims and teaches a ‘Mastery’ approach

- In a Mastery approach, the idea is that children study a Mathematical concept in depth and ‘master’ it before moving on

Year 5 programme of study

Number – number and place value

Statutory requirements

Pupils should be taught to:

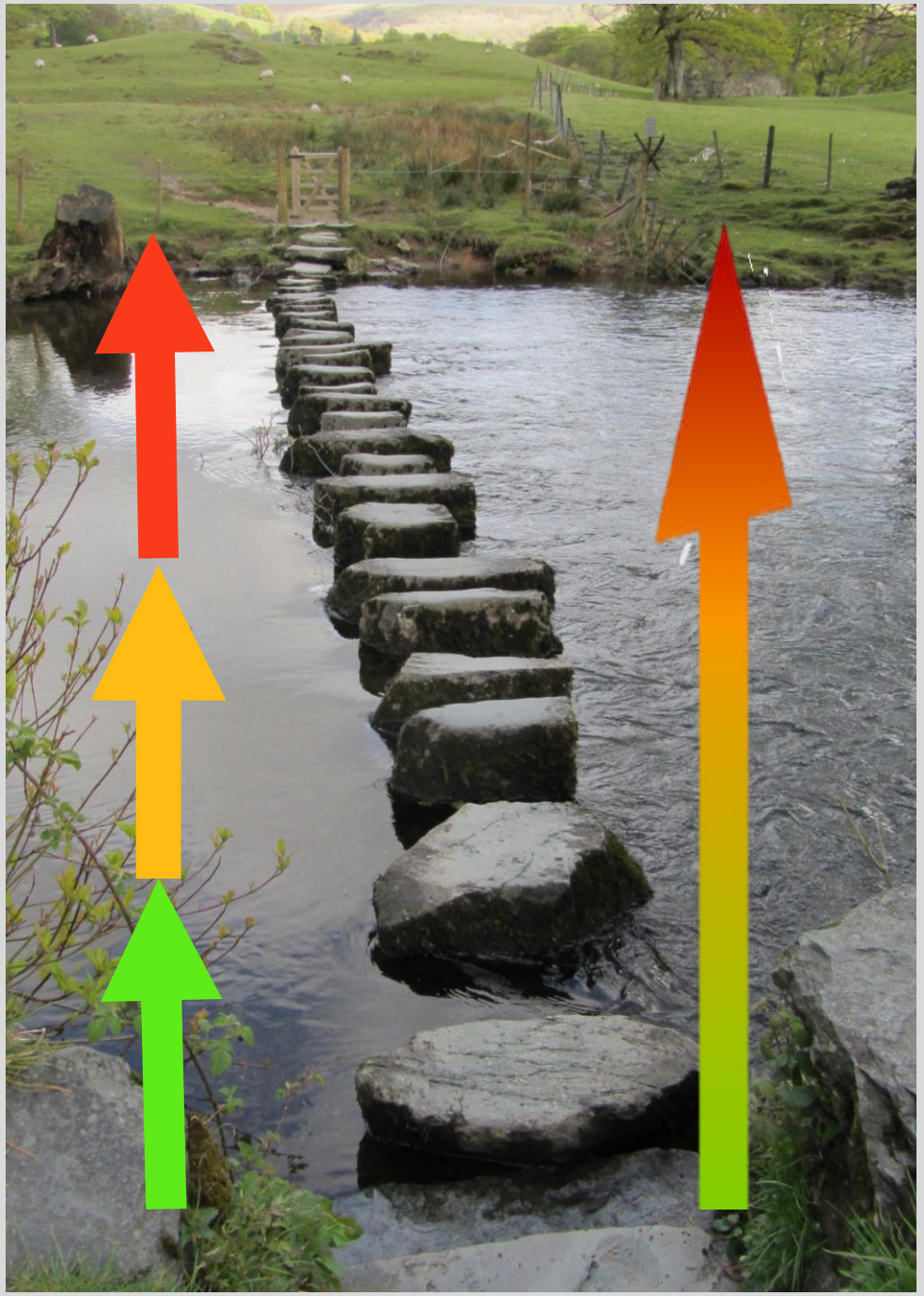
- read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
- count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- solve number problems and practical problems that involve all of the above
- read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

Long Units with Number at the Heart

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value			Number: Addition and Subtraction					Number: Multiplication and Division			Consolidation
Spring	Number: Multiplication and Division			Measurement: Money	Statistics		Measurement: Length and Perimeter			Number: Fractions		Consolidation
Summer	Number: Fractions			Measurement: Time			Geometry: Properties of Shape		Measurement: Mass and Capacity			Consolidation

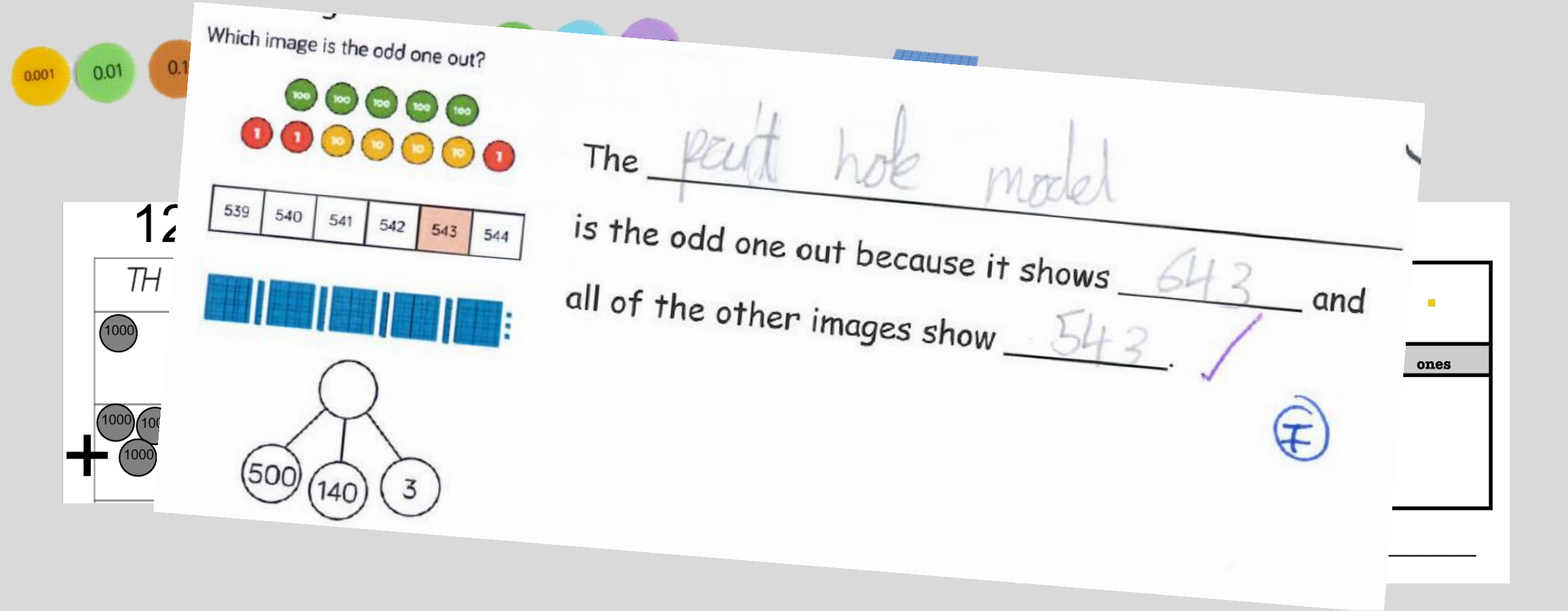
Lessons

- Whole class teaching
- When teaching something new, the children start at the same point in learning – no assumptions are made
- Learning is not capped
- Lesson tasks start in a more simple way, covering earlier foundations then move on to more complex problems, this limits gaps in learning
- The children have the same opportunities but will move through ‘steps’ at a different speed, with varying amounts of support
- Children who grasp concepts at a faster speed can move onto more complex problems quicker



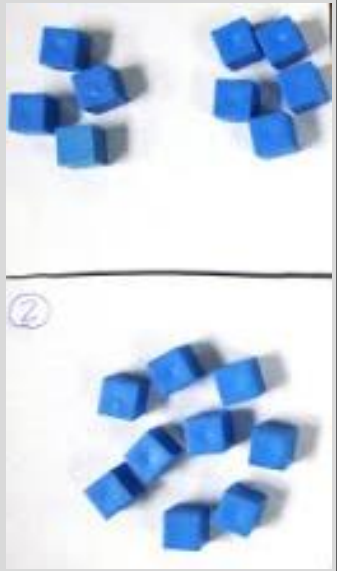
Using pictorials and visuals

We use concrete resources and visual aids where possible to help children build a conceptual understanding, particularly in place value

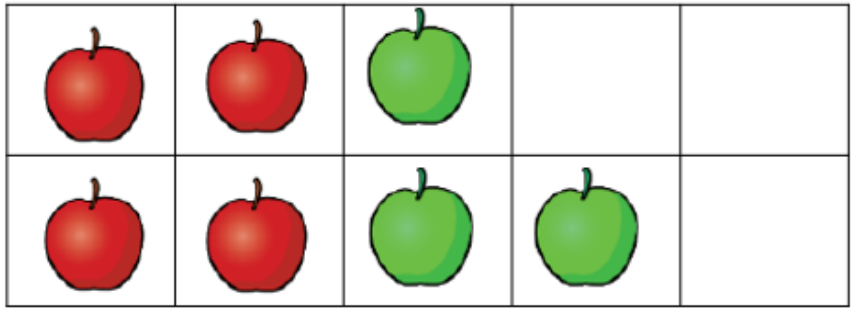


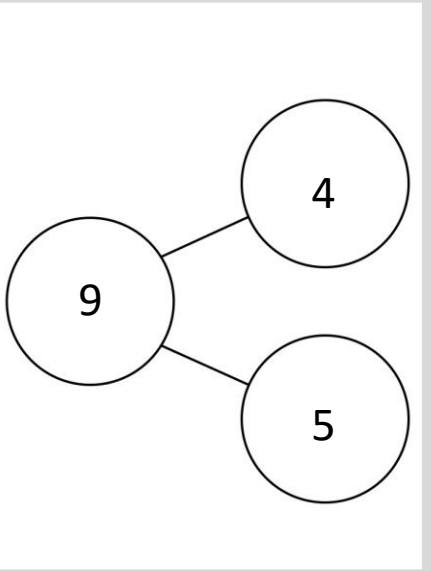
Using pictorials and visuals

The CPA approach (concrete, pictorial/visual, abstract) is used from Year R throughout the school to give meaning to numbers and number sentences



There are 7 apples so the whole is 7.
4 apples are red so the red apples represent 4/7.
3 apples are green so the red apples represent 3/7.





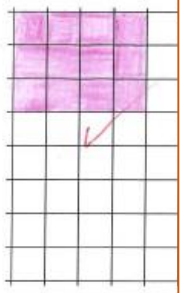
I can use number sentences to draw arrays.

4 x 3 = 12

3 x 4 = 12

12 ÷ 4 = 3

12 ÷ 3 =4

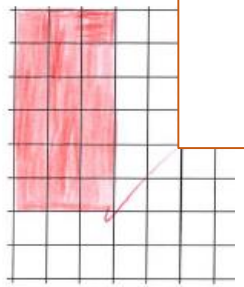


6 x 3 = 18

3 x 6 = 18

18 ÷ 6 = 3

18 ÷ 3 = 6

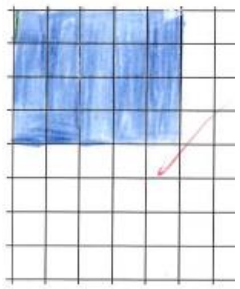


4 x 5 = 20

5 x 4 = 20

20 ÷ 4 = 5

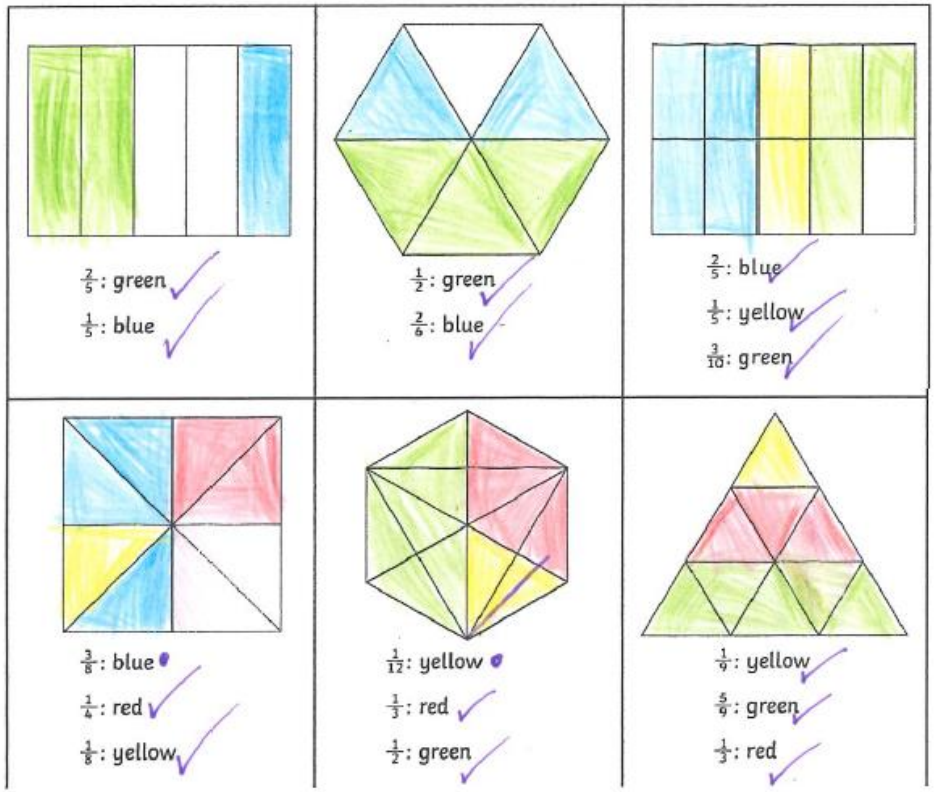
20 ÷ 5 = 4



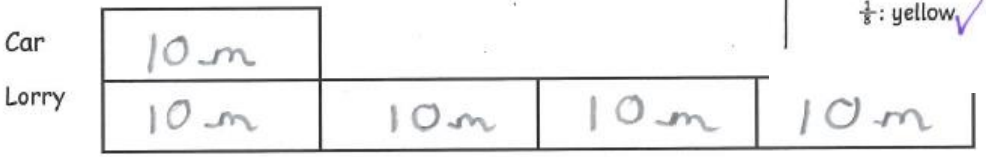
Visuals can help children to understand the 'why' behind a procedure

Having a secure conceptual understanding is more likely to result in sustained learning

Colour the windows to match the fractions listed.

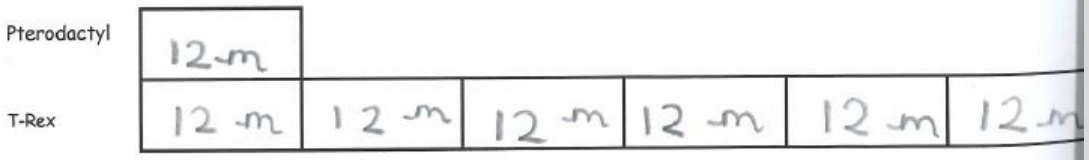


A lorry is 4 times as big as a car. The car 10m long. How long is

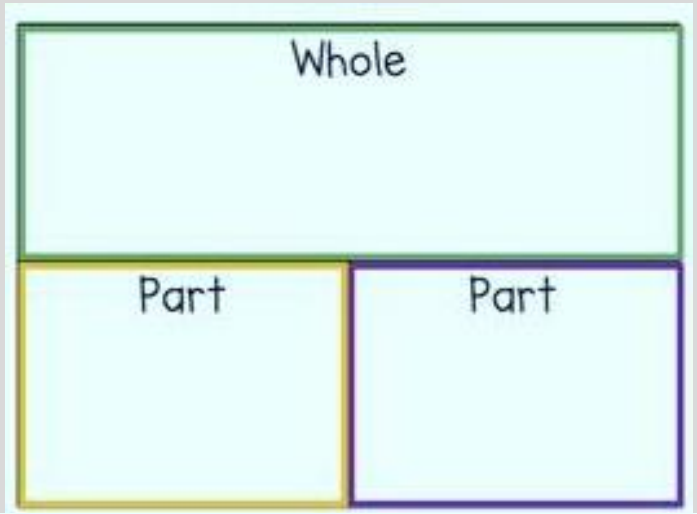


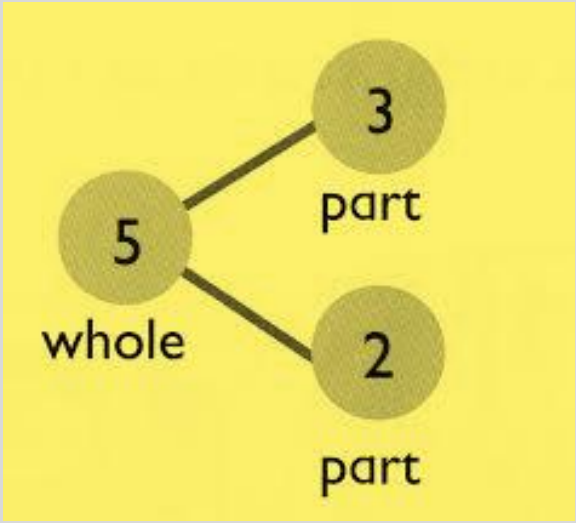
Number sentence- 10m x 4 = 40m

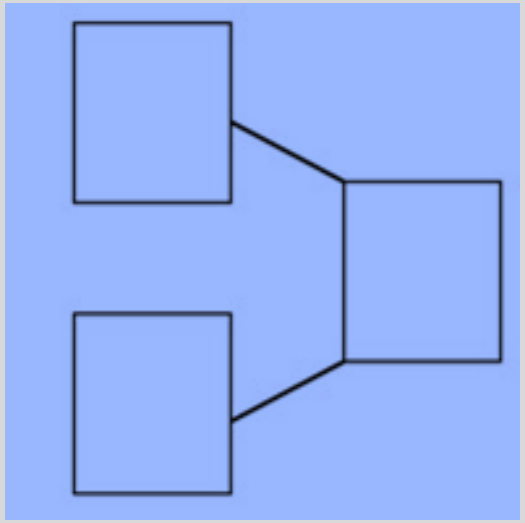
A T-Rex is 6 times as big as a pterodactyl. The pterodactyl is 12m long. How big is the dinosaur?

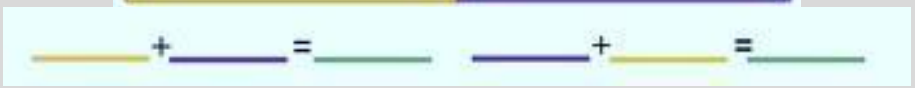


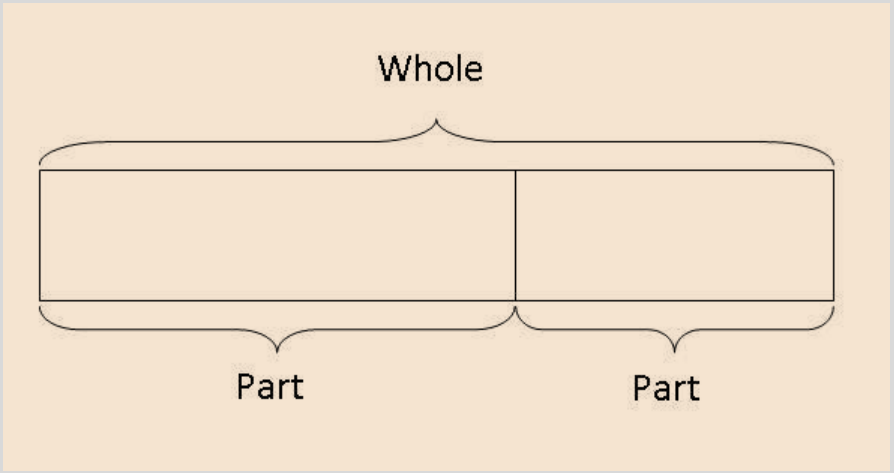
Diagrams can help children to understand the structures of number sentences

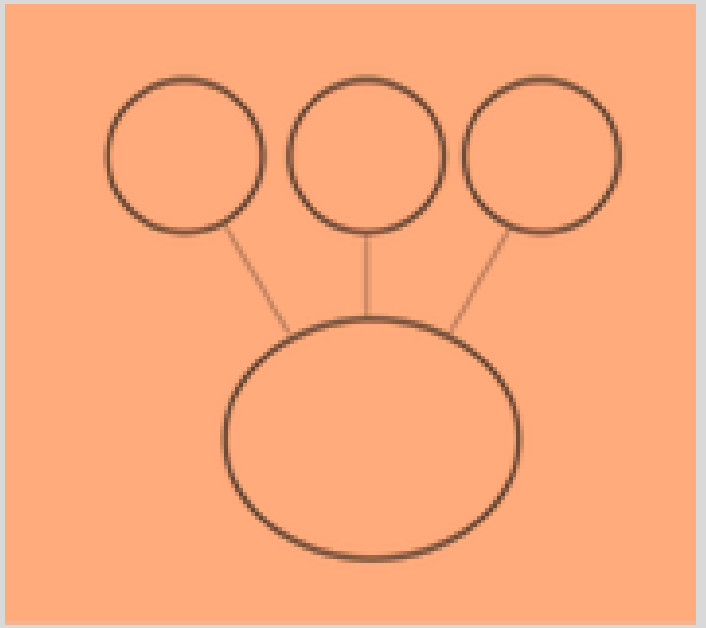












These diagrams and structures help children to understand what they need to do to solve a problem

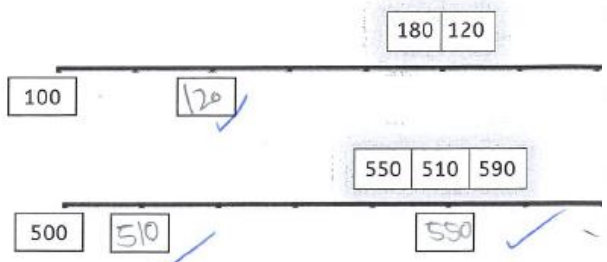
Complete these number tracks – going up in 10s

0	10	20	30	40	50	60	70	80	90	100
100	110	120	130	140	150	160	170	180	190	200
400	410	420	430	440	450	460	470	480	490	500

Fill in the missing numbers – going up in 10s

0	10	20	30	40	50	60	7
200	210	220	230	240	250	260	27
600	610	620	630	640	650	660	6

Place the numbers in the correct boxes – going up in 1



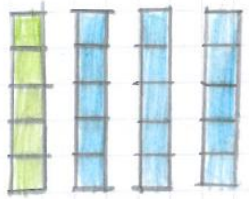
Tens	Ones
|	1 1 1 1
|	1 1 1 1
|	1 1 1 1
|	1 1 1 1

Draw it; solve it.

There are 5 green cubes in a box.

There are 3 times as many blue cubes than green cubes in the box.

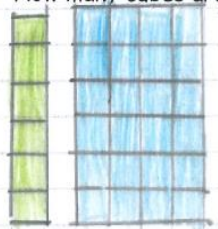
How many cubes are there **altogether**? he has 20 cubes



There are 6 green cubes in a box.

There are 4 times as many blue cubes than green cubes in the box.

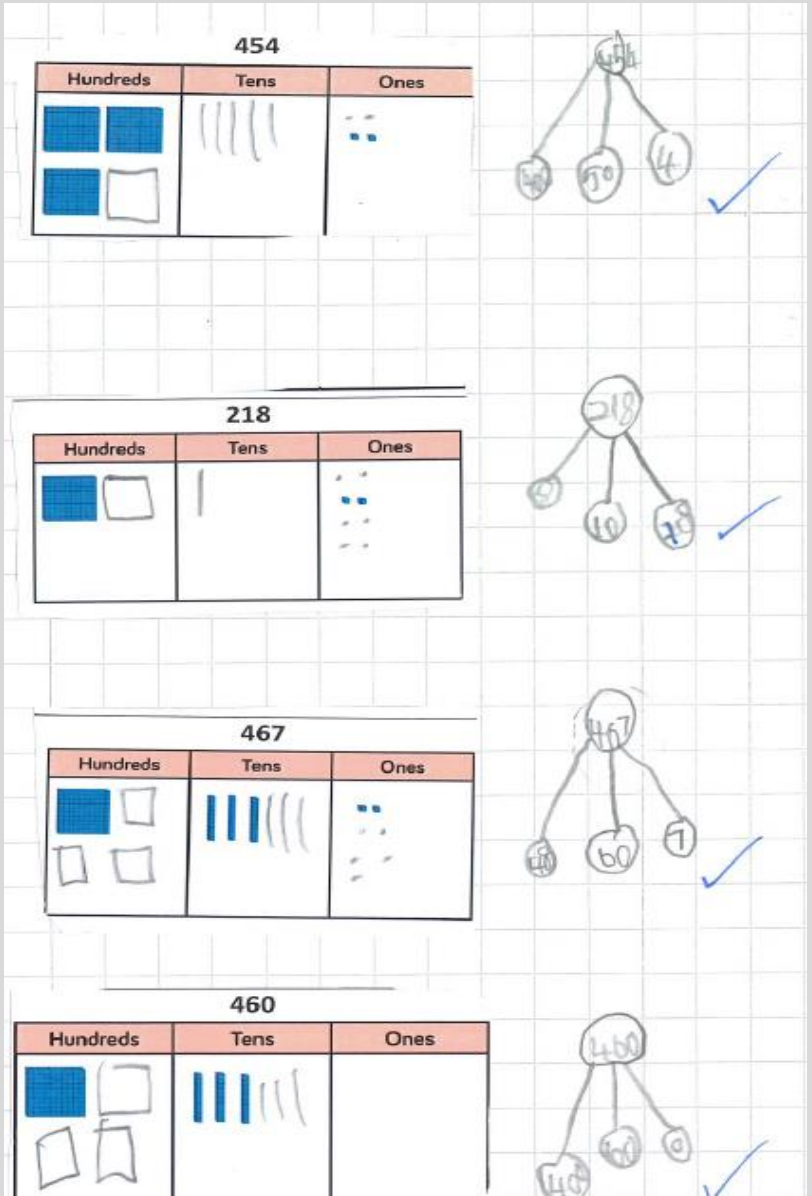
How many cubes are there **altogether**? he has 30 cubes

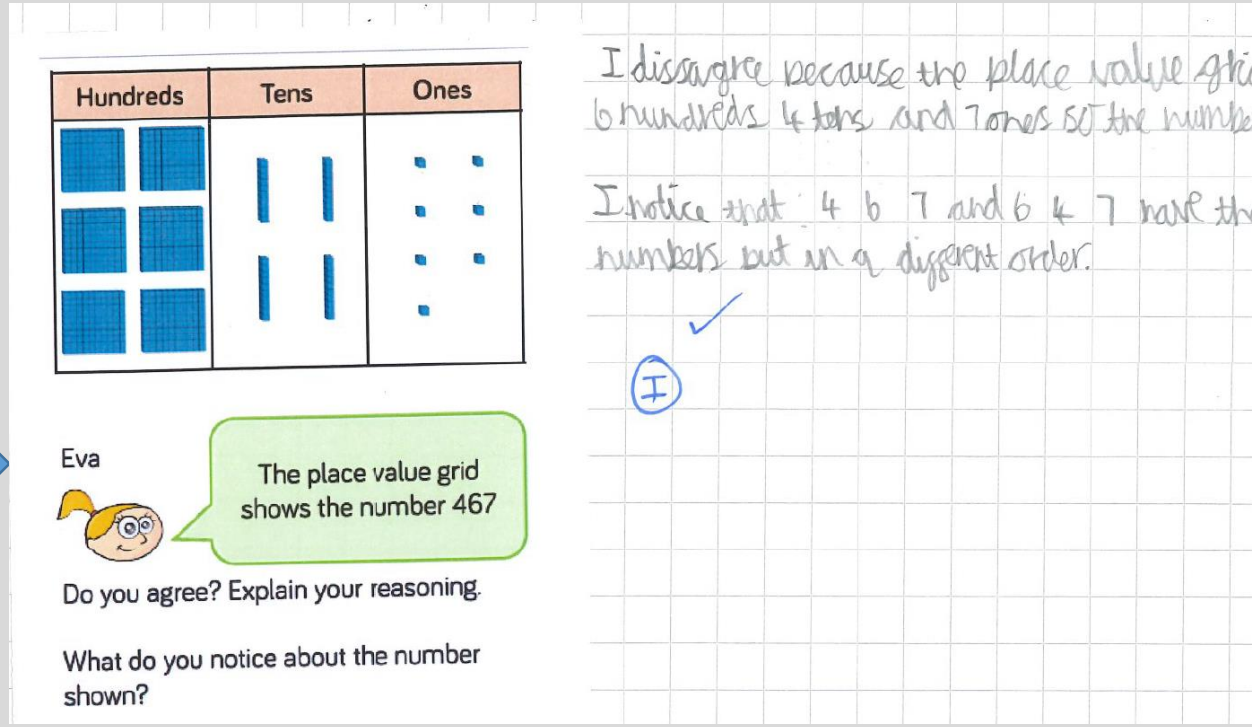


T + O
10 + 4
× 4
50 + 6 = 56
10

56 children

Procedural skills are practised in lessons before applying them to contextual problems





Deep Thinking – breadth and depth in learning

In order to embed skills and understanding, children will solve more complex problems which will deepen their understanding of a concept

2. Write the missing digits in the boxes.

$$\begin{array}{r} 4\ 9\ \square \\ +\ 3\ \square\ 3 \\ \hline 8\ 6\ 4 \end{array}$$

Explain how you found the number in the **bold** box:

$$\begin{array}{r} \square\ \square\ \square \\ +\ \square\ \square\ \square \\ \hline 8\ 6\ 6 \end{array}$$

What are all the possibilities?
List them systematically

Circle the mistake and explain what their misconception is

$$\begin{array}{r} 7\ 6\ 2 \\ +\ 6\ 3\ 8 \\ \hline 1\ 3\ 0\ 0 \\ \hline \end{array}$$

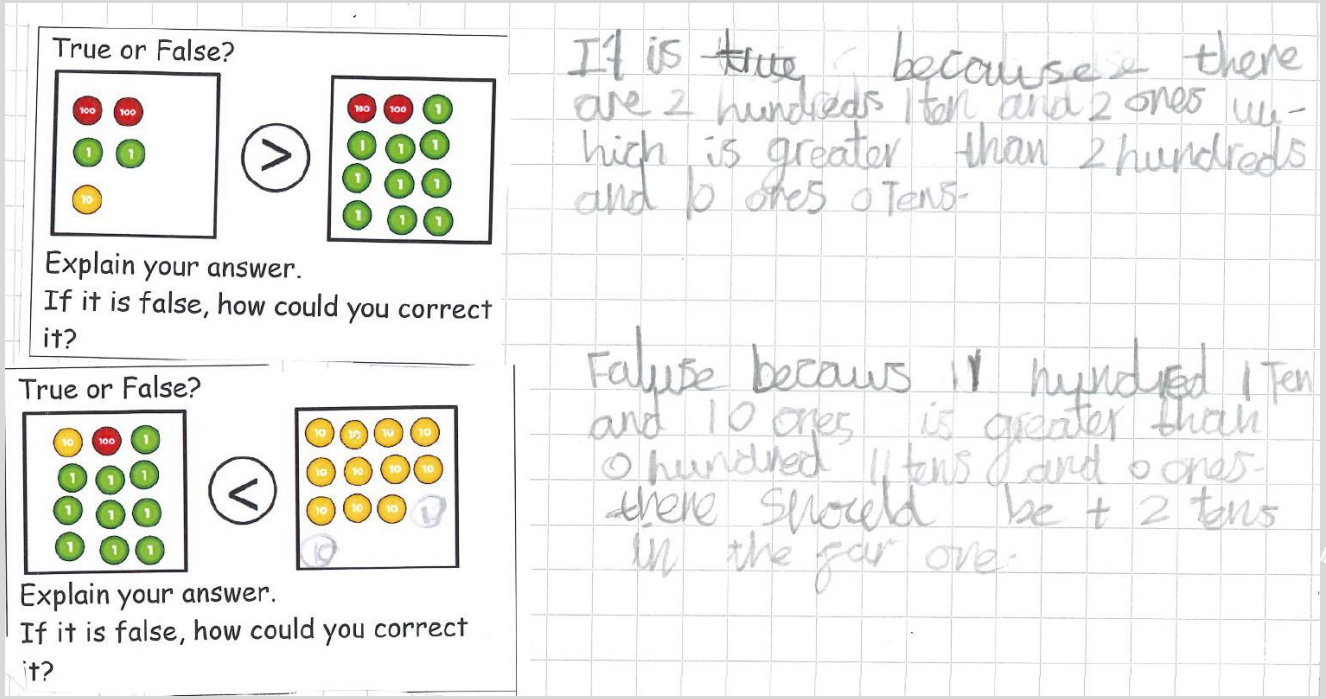
$$\begin{array}{r} b\ b \\ +\ \ \ a \\ \hline a\ c\ c \end{array}$$

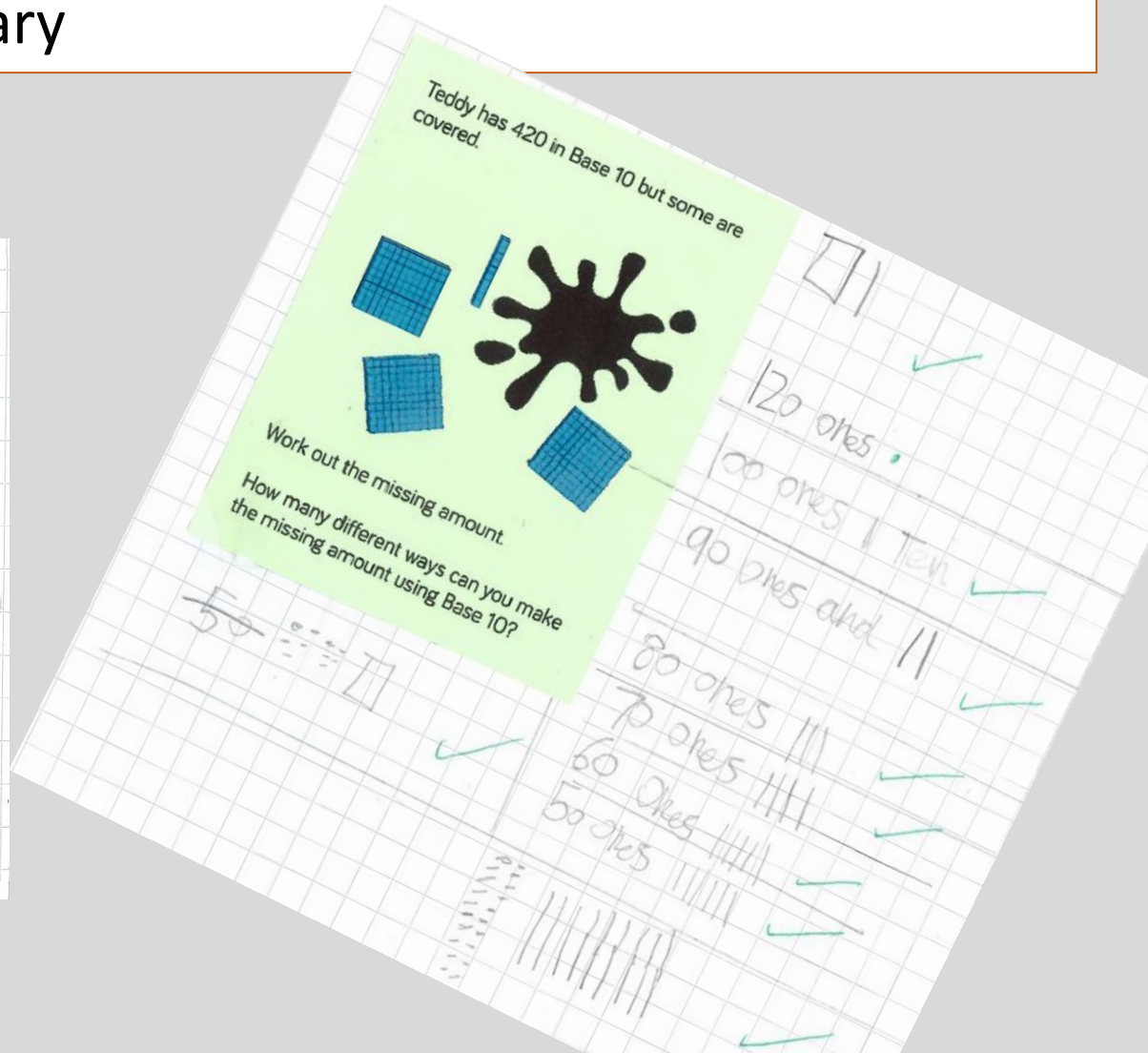
What are the values of b, a and c?

True or false
A 2-digit number add a 1-digit number always totals a 2-digit number

Reasoning and Explaining

Not all Maths is just wrong or right. In order to show a deep understanding about a concept, children need to be able to explain their thinking using Mathematical vocabulary





Stem Sentences

Stem sentences are a oral or written framework which is repeated. It helps children to identify patterns and remember key facts.

1 ten is equal to 1000

2 thousands are equal to 2000

3 thousands are equal to 3000

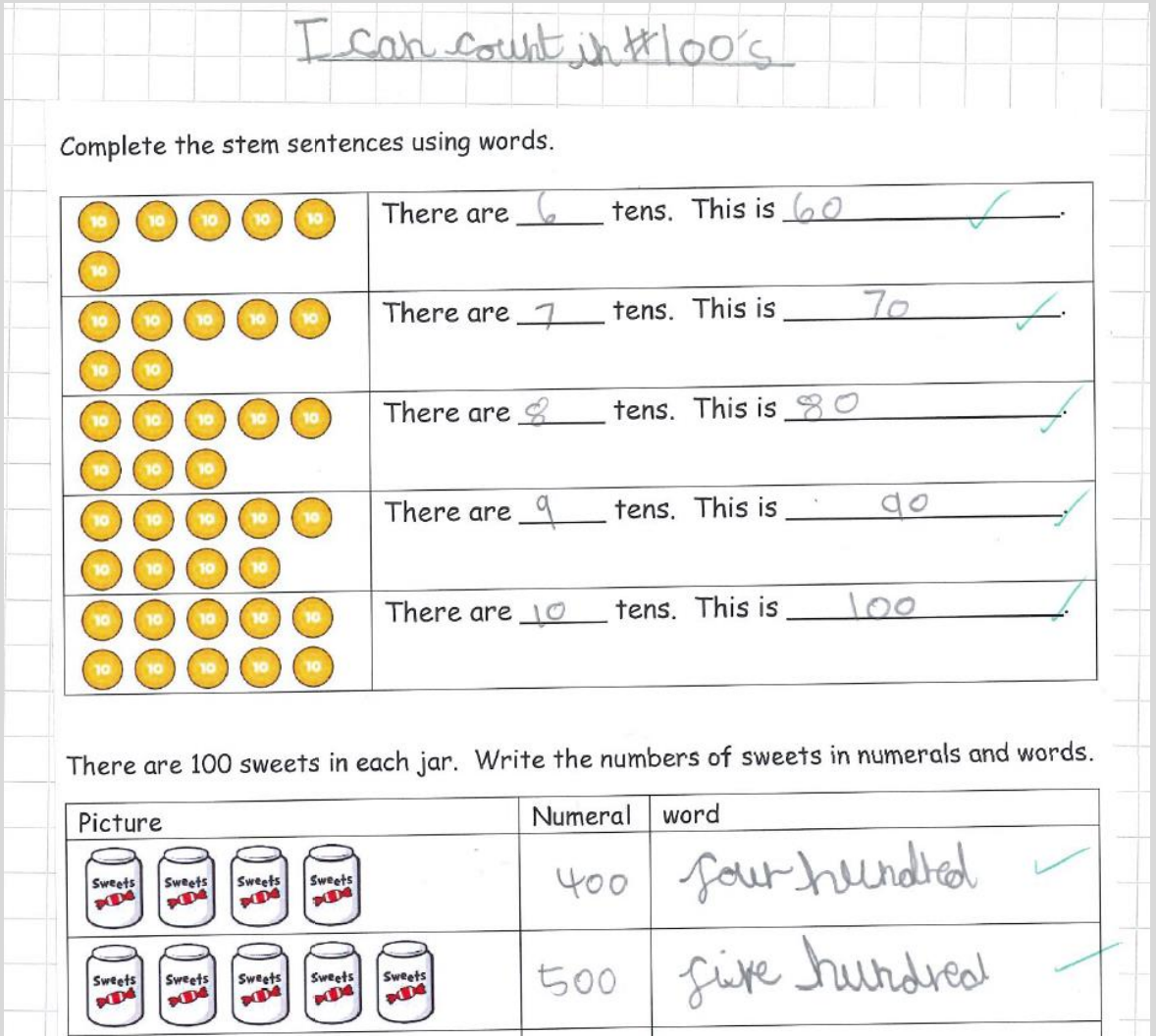
4 thousands are equal to ___

5 thousands are equal to ___

__thousands are equal to ___

__thousands are equal to ___

__thousands are equal to ___



I can count in #100's

Complete the stem sentences using words.

10 10 10 10 10 10	There are 6 tens. This is 60.
10 10 10 10 10 10 10	There are 7 tens. This is 70.
10 10 10 10 10 10 10 10	There are 8 tens. This is 80.
10 10 10 10 10 10 10 10 10	There are 9 tens. This is 90.
10 10 10 10 10 10 10 10 10 10	There are 10 tens. This is 100.

There are 100 sweets in each jar. Write the numbers of sweets in numerals and words.

Picture	Numeral	word
Sweets Sweets Sweets Sweets	400	four hundred
Sweets Sweets Sweets Sweets Sweets	500	five hundred

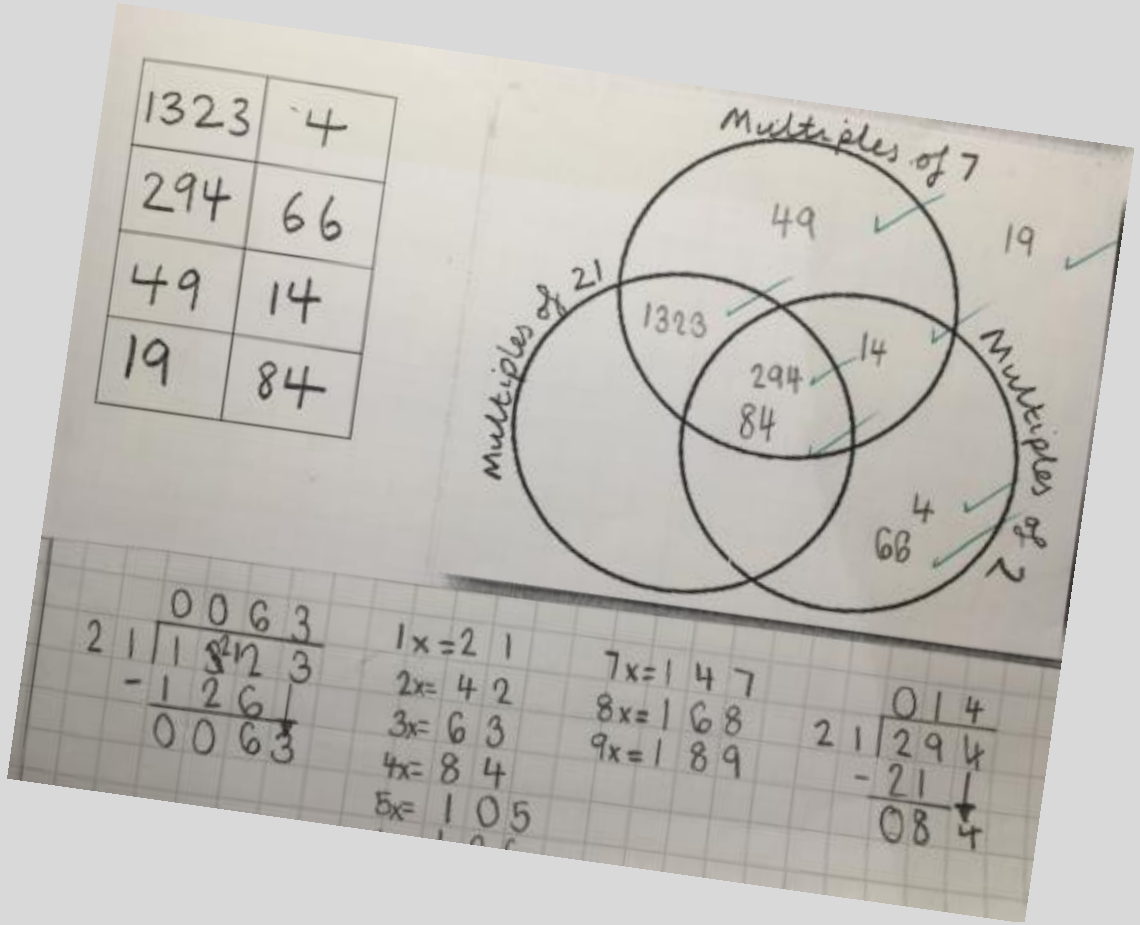
Re-visiting previous concepts and making connections

We aim to keep learning alive by revisiting concepts during Morning Maths Challenges or in future lessons. When children are able to make connections with other Mathematical concepts, then their learning becomes more purposeful

What you learned last month…

What you learned last week…

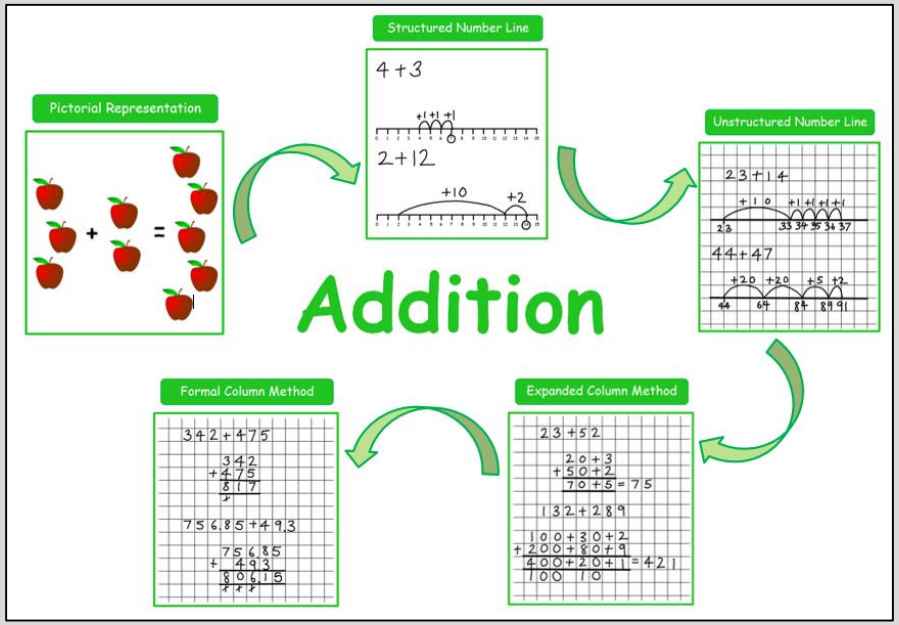
What you learned yesterday…

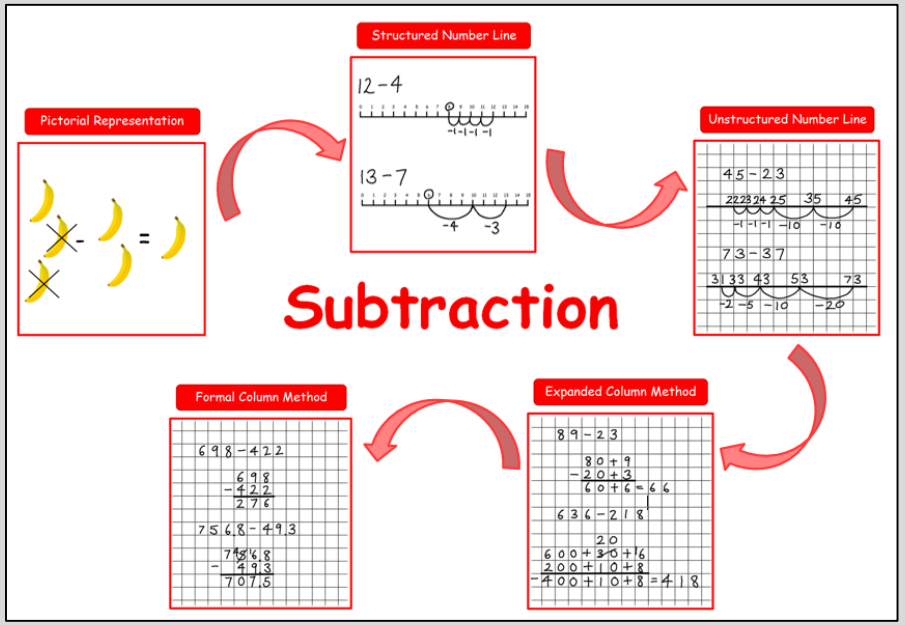


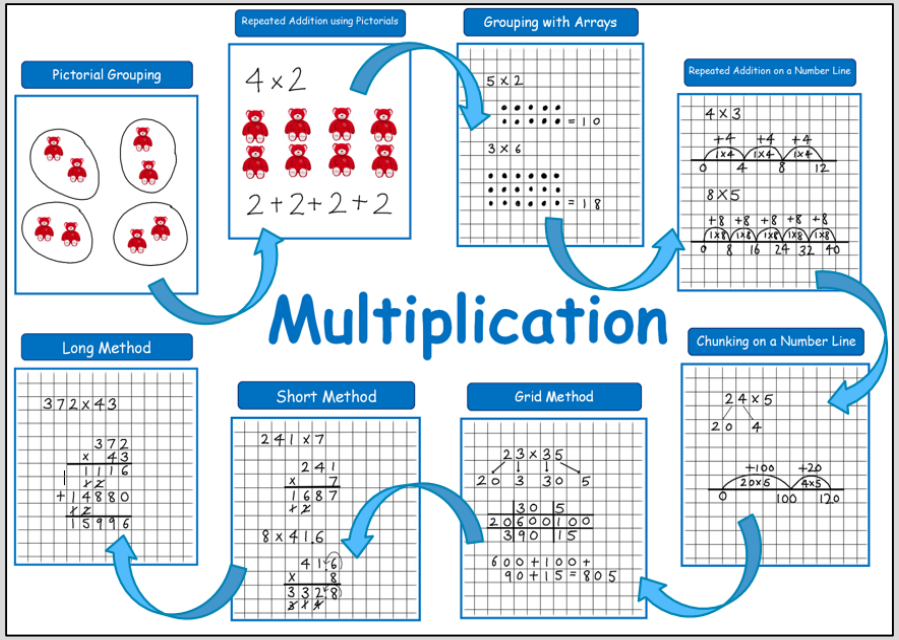
Number Fluency – Written Methods

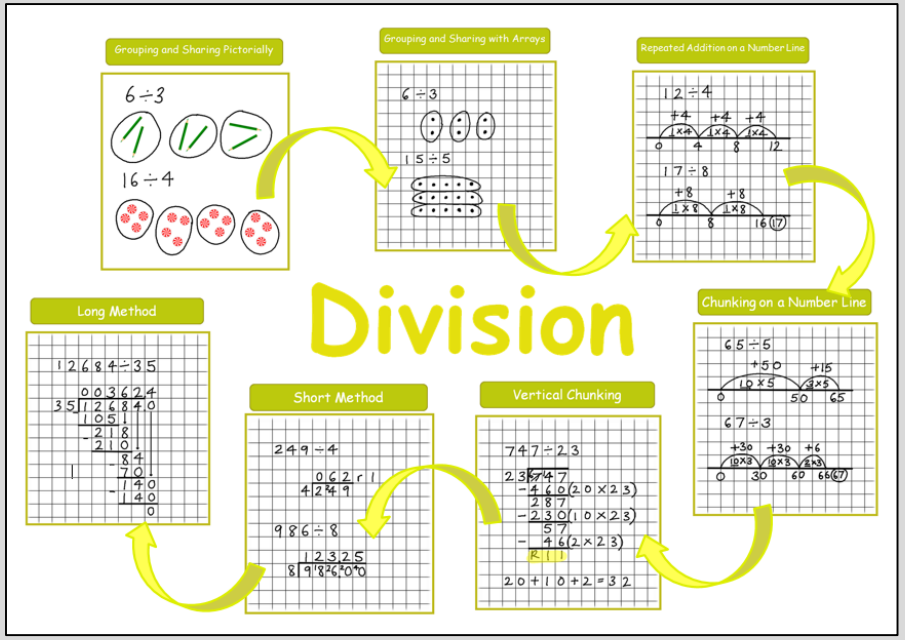
Our calculation policy ensures steady progression from Year R – Year 6.

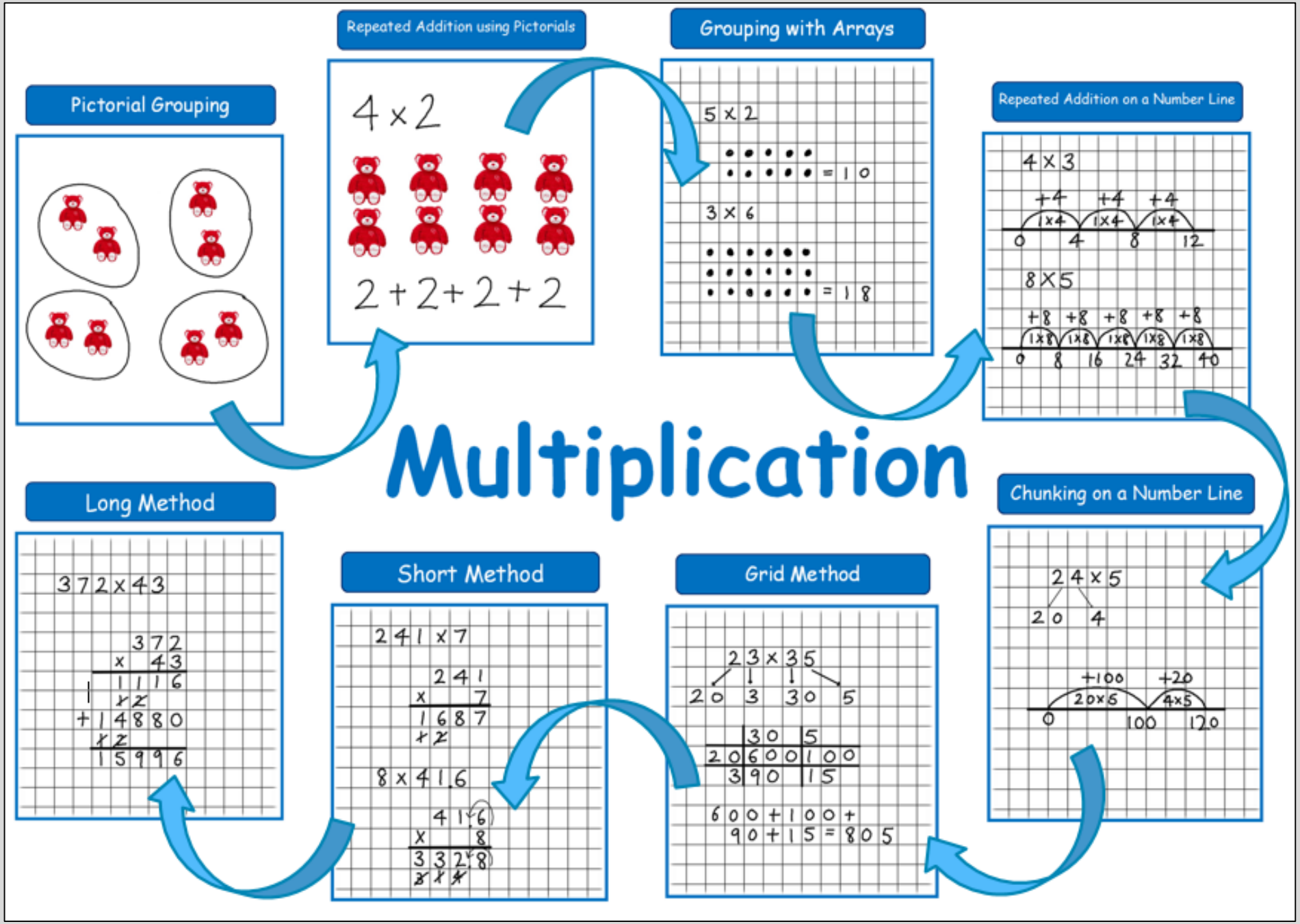
These posters are displayed in classrooms to aid children in their working.










Pictorial Grouping
Repeated Addition using Pictorials
4 x 2
2 + 2 + 2 + 2
Grouping with Arrays
5 x 2
= 10
3 x 6
= 18
Repeated Addition on a Number Line
4 x 3
+4 +4 +4
1x4 1x4 1x4
0 4 8 12
8 x 5
+8 +8 +8 +8 +8
1x8 1x8 1x8 1x8 1x8
0 8 16 24 32 40
Multiplication
Long Method
372 x 43
372
x 43
1116
+14880
15996
Short Method
241 x 7
241
x 7
1687
8 x 416
416
x 8
3328
Grid Method
23 x 35
20 3 30 5
30 5
20 600 100
3 90 15
600 + 100 +
90 + 15 = 805
Chunking on a Number Line
24 x 5
20 4
+100 +20
20x5 4x5
0 100 120

Variation and Making Small Steps

When a new concept is introduced, we provide questions that begin with just slight variations before moving onto more mixed practice

42 x 5 =
43 x 5 =
47 x 5 =
47 x 6 =
57 x 6 =
67 x 7 =
63 x 8 =

11	Nearest 10	
12	Nearest 10	
13	Nearest 10	
14	Nearest 10	
15	Nearest 10	
16	Nearest 10	

Q2. Emma is thinking of a number.
- **My number is odd.**
- **It is less than 15**
- **It is a multiple of 3.**
- **It can be divided by 4.**

What number is Emma thinking of?

Q3. Sharon is thinking of a number.
- **My number is odd.**
- **It is less than 10.**
- **It is a multiple of 3.**
- **It can be divided by 2.**

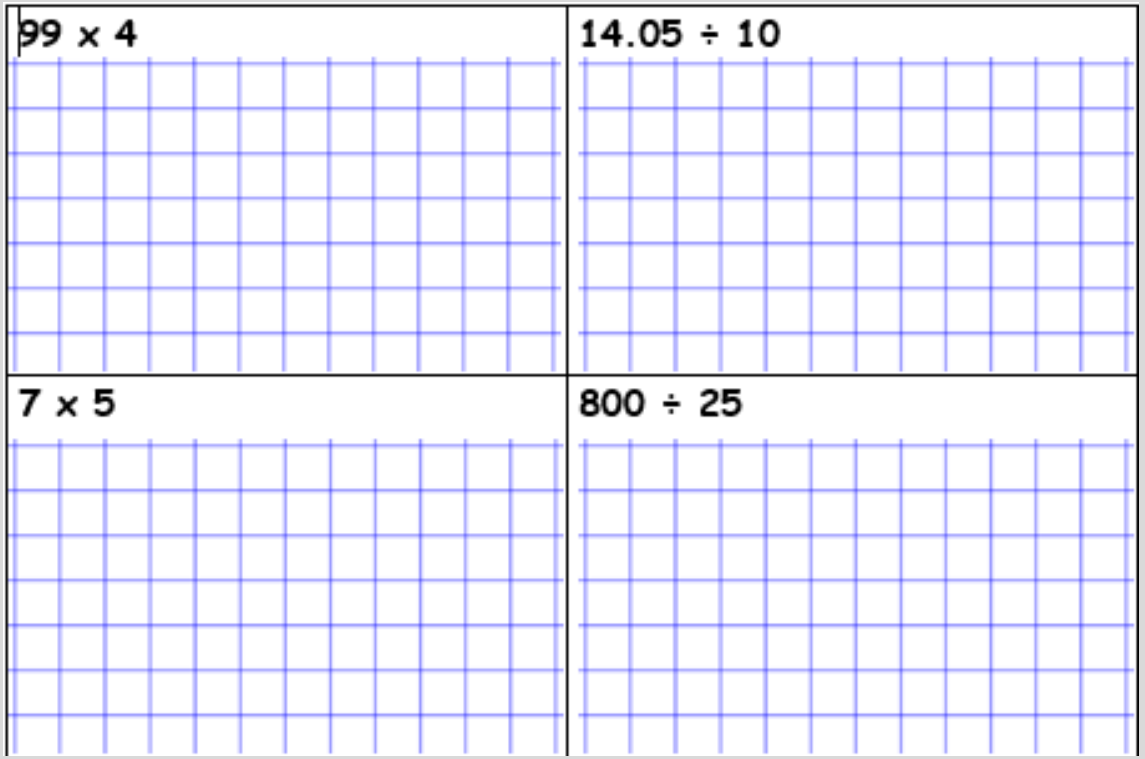
What number is Sharon thinking of?

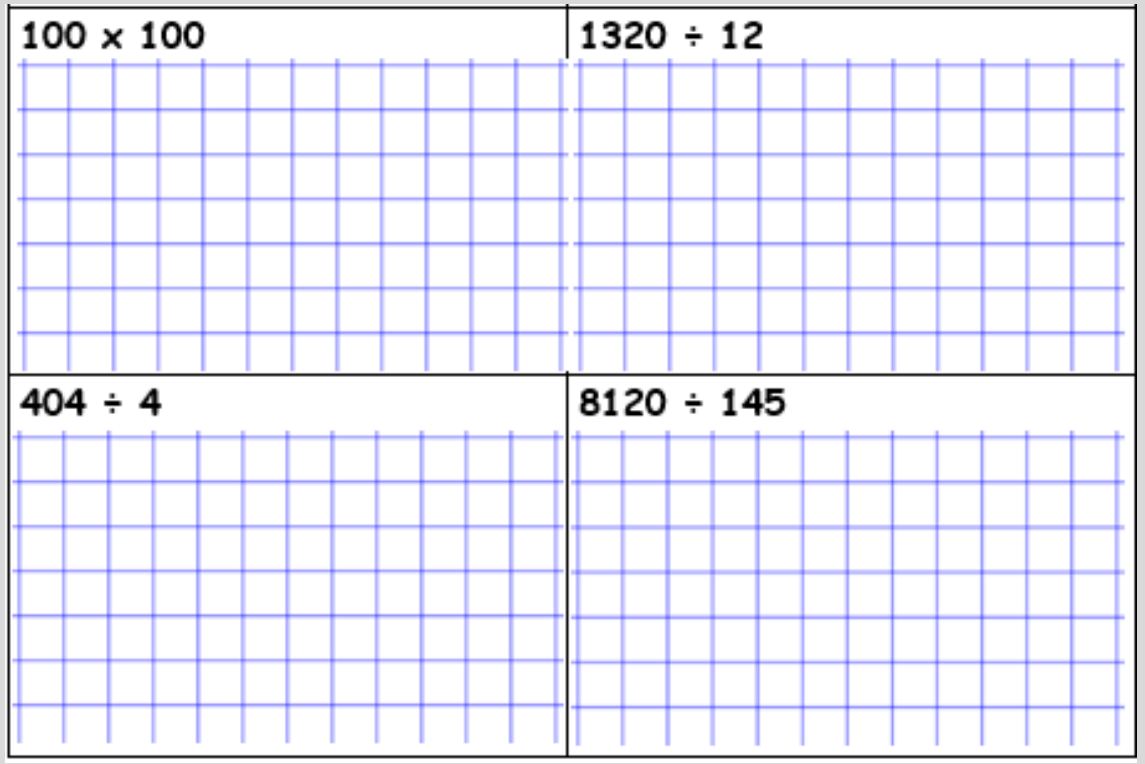
Q4. Jaden is thinking of a number.
- **My number is odd.**
- **It is less than 30.**
- **It is a multiple of 3.**
- **It can be divided by 5.**

What number is Jaden thinking of?

a) 15 is one ten less than _____
b) 45 is one ten less than _____
c) 345 is one hundred less than _____
d) 345 is two hundreds less than _____
e) 345 is three hundreds less than _____
f) 7,345 is one thousand less than _____
g) 7,345 is two thousand less than _____
h) 7,345 is four thousands less than _____

Number fluency

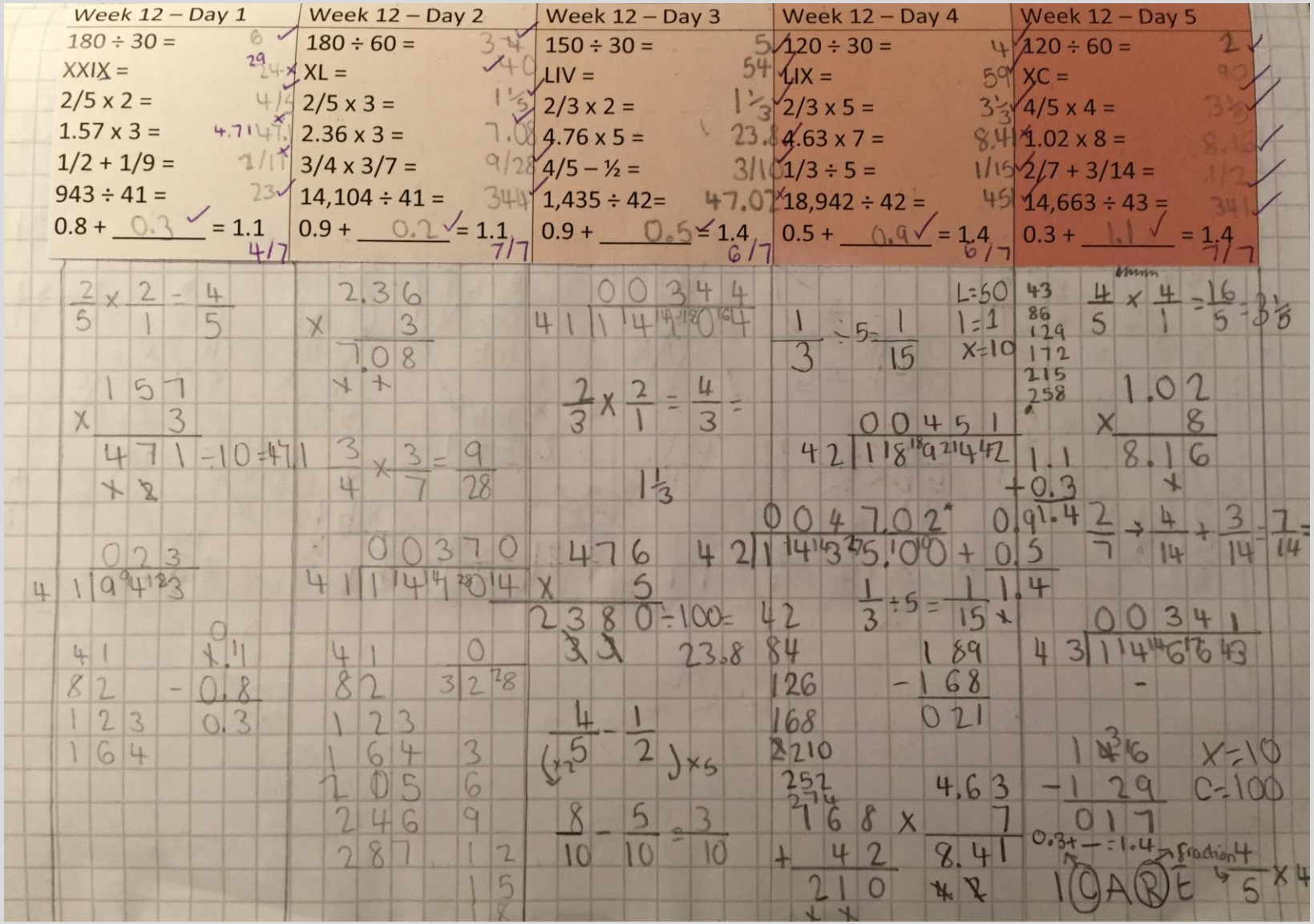




When solving number problems, we need to equip our children with the ability to choose efficient methods drawing on their knowledge.

Alongside more formal methods, we teach children a range of mental maths skills and how to use jottings to support their thinking.

Daily Fluency Practice



Times Tables/ Multiplication Recall

Learning their times tables is fundamental for solving more complex number problems as this knowledge is required for most areas of Mathematics

National Curriculum - Statutory Guidance for multiplication and division tables

Year 2

Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables.

Year 3

Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.

Year 4

Recall multiplication and division facts for multiplication tables up to 12 × 12.

2x÷	3x÷	4x÷	5x÷	6x÷	7x÷	8x÷	9x÷	10x÷	11x÷	12x÷

Join us back in the classrooms

- Lesson about rounding:

<u>I can round to the nearest 100.</u>

- Children have been introduced to this concept
- They have been identifying the 100 before and the 100 after
- Use rounding rules they have then been rounding up or down
- Feel free to question their understanding – how do you know? Can you explain that to me?