

Mathematics Parents' Workshop



Reasoning and problem solving for life

OECD

*More than ever before, living and working in the 21st century requires the “four Cs” – **creativity, critical thinking, communication and collaboration***

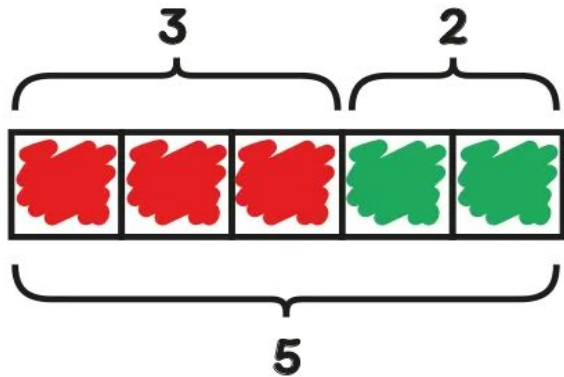
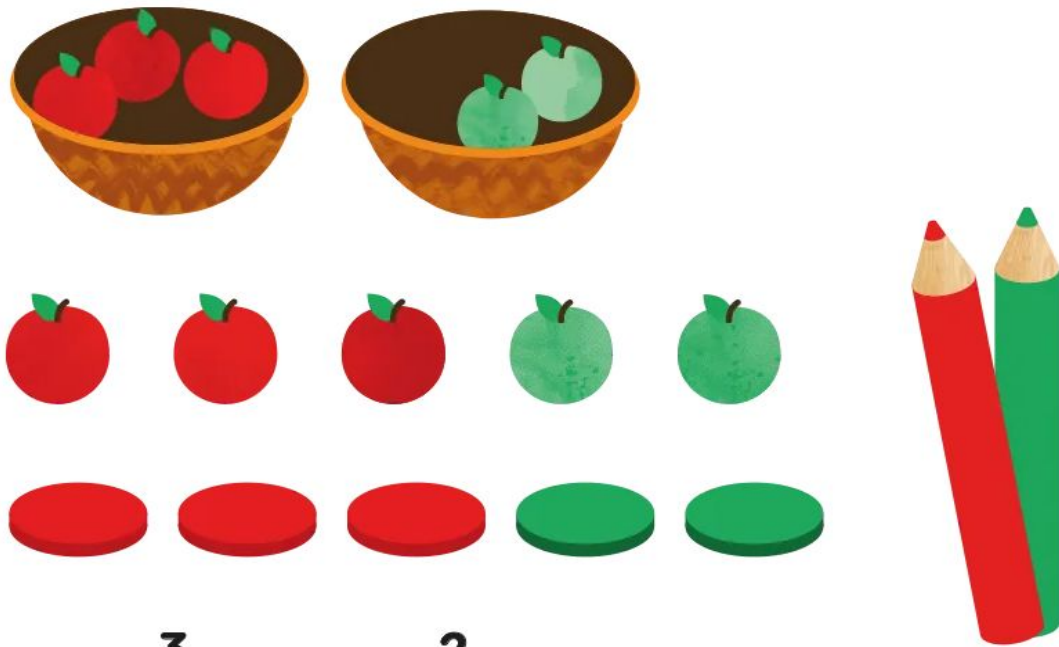
Jobs increasingly require problem solving skills ..*Today’s 15-year-olds who lack advanced problem solving skills face high risks of economic disadvantage as adults.*

A good learner is a flexible learner who can use and combine strategies

OECD 2016

Opportunities to develop the reasoning skills and habits of self-directed learners and effective problem-solvers need to be prioritised.

OECD 2012



$$3 + 2 = \boxed{5}$$

Concrete
Pictorial
Abstract

Concepts, not bigger numbers



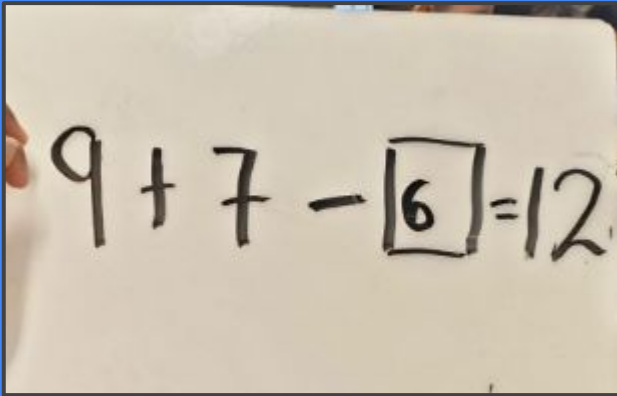
KS1 SATs

$$9 + 7 - \square = 12$$

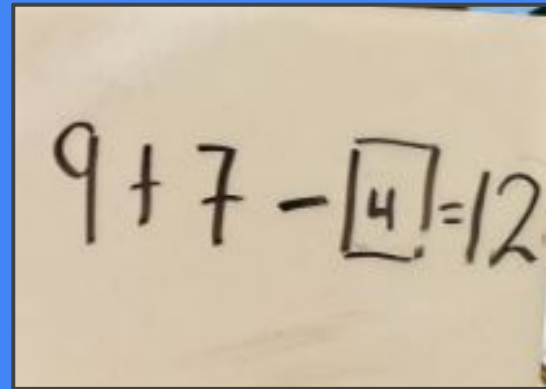
KS1 SATs

$$9 + 7 - \square = 12$$

First Attempt

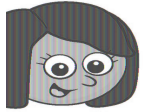


A photograph of a hand holding a piece of paper with the equation $9 + 7 - \boxed{6} = 12$ written in black ink.



A photograph of a hand holding a piece of paper with the equation $9 + 7 - \boxed{4} = 12$ written in black ink.

Ron has 2 more apples than Mo.
Mo has 5 apples.
Kim has 1 less apple than Mo.



Draw each child's apples.

Have a think



KS2 Assessment

Write the missing number to make this calculation correct.

$$754 \times 6 + 754 \times 3 = 754 \times$$



KS2 Assessment

Write the missing number to make this calculation correct.

$$754 \times 6 + 754 \times 3 = 754 \times$$



Gabriel thinks of a number.

He multiplies his number by 5 and
then adds 7

His answer is 72

What number did Gabriel think of?

(Total for Question 11 is 3 marks)




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then adds 7

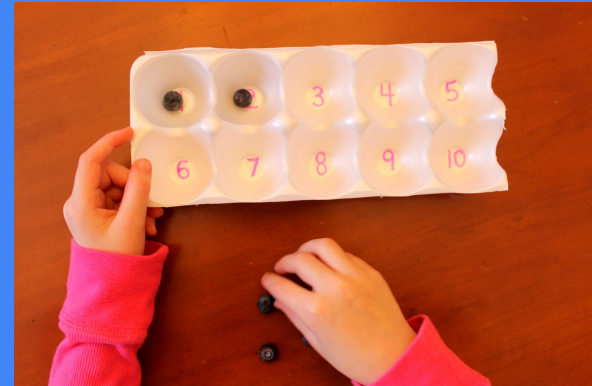
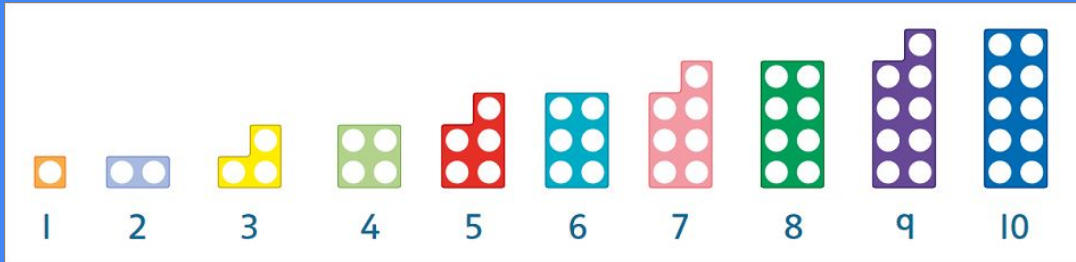
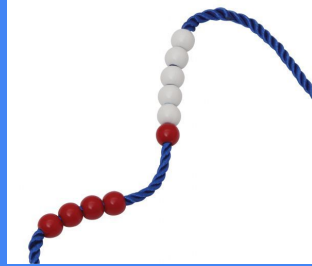
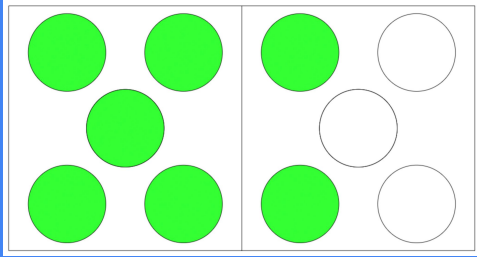
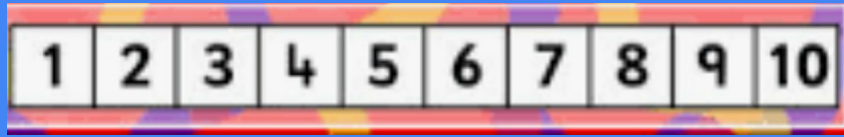
His answer is 72

What number did Gabriel think of?

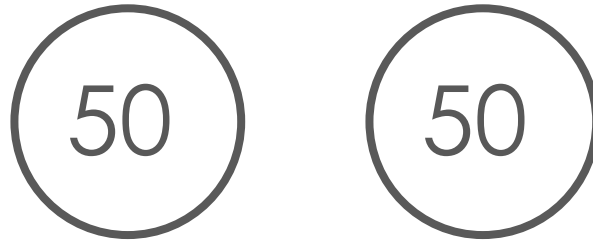
(Total for Question 11 is 3 marks)


$$5 + 7 = 72$$


$$13 \times 5 = 65$$



Cal and Mo describe the units. Whose way is correct?



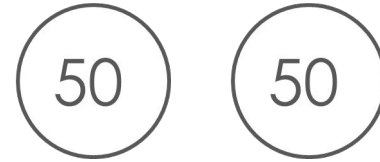
There are _____.
There is _____, _____ times.

Which multiplication expressions could be used to represent each picture of counters?



$$1 \times 50$$

$$50 \times 1$$



$$2 \times 50$$

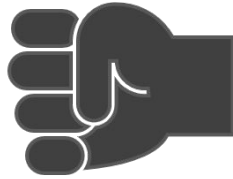
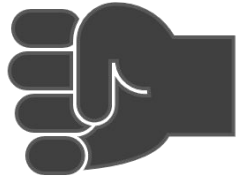
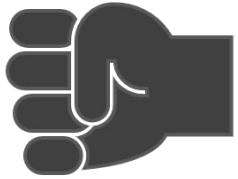
$$50 \times 2$$



There is/are _____.
There is _____, _____ time/s.



Represent the picture using unitised counters and a multiplication expression

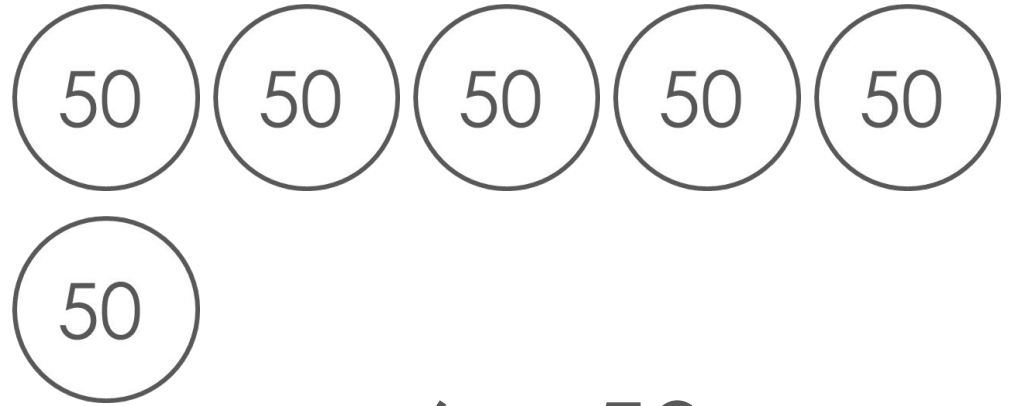


$$3 \times 50$$

There are ____ ____ .
There is ____ , ____ times.



Represent the picture using unitised counters and a multiplication expression



$$6 \times 50$$

There are _____.
There is _____, _____ times.

Autumn term Block 1 Place value



In this block, we think about numbers in different ways. Here are some ways we can show and talk about 13



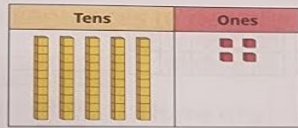
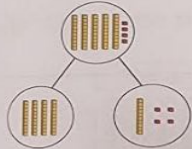
13 written as a word is **thirteen**.

Thirteen written in **numerals** is 13

13 is made up of 1 **ten** and 3 **ones**. $10 + 3 = 13$



When we break numbers into smaller parts, it is called **partitioning**. We can partition numbers into tens and ones in different ways. We can record the partitions as number sentences.



54 = 5 tens and 4 ones

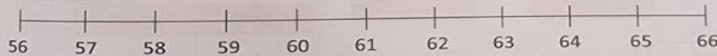
$$54 = 50 + 4$$

54 = 4 tens and 14 ones

$$54 = 40 + 14$$



We think about numbers on a **number line**. The value of the **start point** is 56. This number line has 10 **intervals**.



Less than <

Equal to =

Greater than >

We use these symbols to compare numbers. The number line helps us to see that $60 > 57$

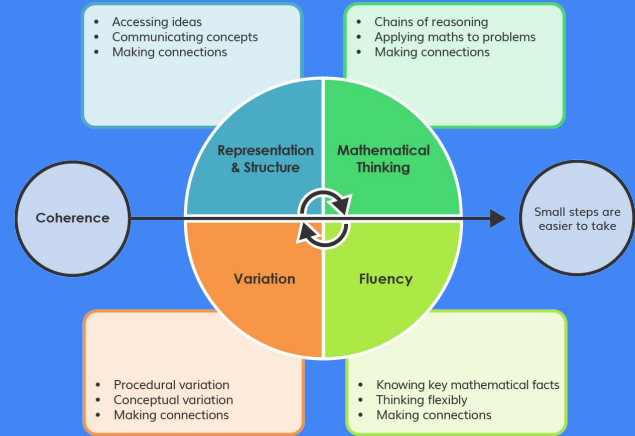


Here are some maths words that we see. What do they mean?

place value numerals hundreds tens ones partition
order compare interval start point equal to
greater than less than estimate



Teaching for Mastery Five Big Ideas

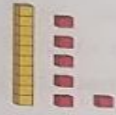



Place value

Date: _____

Let's practise

1 Write the numbers in numerals and words.

a)  _____

b)  _____

c)  _____

2 How many objects are there?

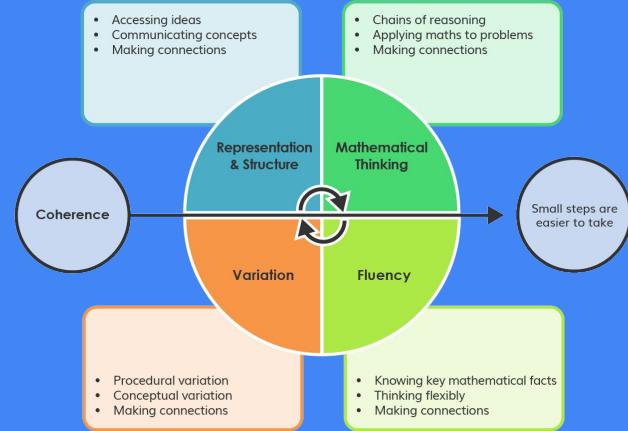
a)  _____

b)  _____

c)  _____



Teaching for Mastery Five Big Ideas



3 Tiny is counting candles.

I have 50 candles.



Do you agree with Tiny? _____

Explain your answer.

4 Complete the sentences to describe the numbers.

a)

Tens	Ones

There are tens and ones.

The number is

b)

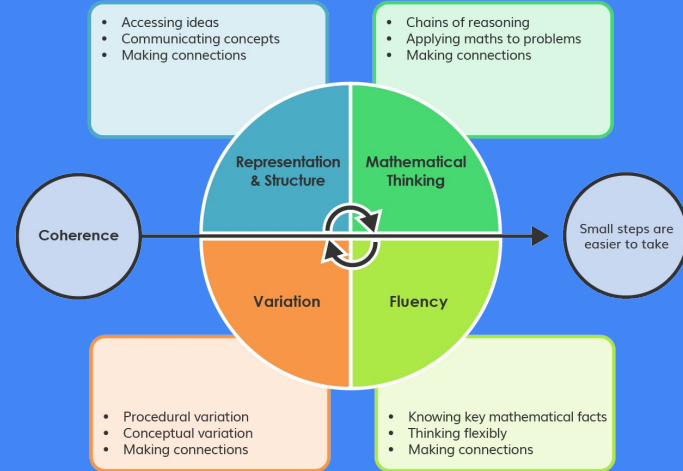
Tens	Ones
3	6

There are tens and ones.

The number is

Teaching for Mastery

Five Big Ideas



Put some handfuls of pasta on a table.

If you don't have pasta, use another group of small objects.



Arrange them into groups of 10



How many pieces of pasta have you got?




How many tens are there?

How many ones are there?

How many in total?

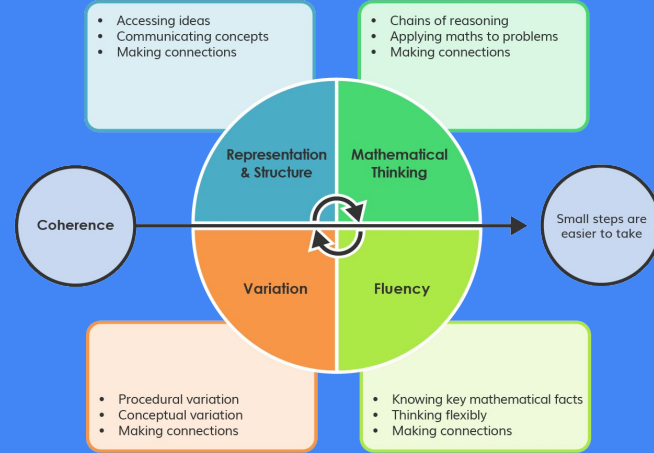
Do you need to count each piece of pasta individually?



How did you find these questions?   

Teaching for Mastery

Five Big Ideas





Aisha Ceesay

- October 10
Recognise the place value of each digit in a two-digit number (tens, ones).
[...and 4 other skills](#)

Arina Smolnikova

- October 10
Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.
[...and 3 other skills](#)

Abigail Koufie

- October 10
Subtract a 1 digit number from a 2 digit number
[...and 4 other skills](#)



Engage and motivate

Over 30 single and multiplayer games for pupils to play and earn online rewards with new games added regularly.



Identify gaps

Pinpoint areas to work on with diagnostic and assessment tools, providing a snapshot of children's progress.



Targeted practice

Embed Sumdog into teaching and learning by assigning practice on specific skills for groups or individuals.

grapes ✓	10 strawberries ✓	10 oranges ✓
12 ✓		18 ✓
grapes	9 ✓ strawberries	

I sorted the groups

I sorted my groups in fruits.

What groups do you have?

grapes, strawberries and oranges

15.9.20 22

Lo: 20 tens ones

22

$$20 + 2 = 22 \checkmark$$

$$2 + 20 = 22 \checkmark$$

$$22 = 20 + 2 \checkmark \checkmark$$

$$22 = 2 + 20 \checkmark \checkmark$$

27

$$20 + 7 = 27 \checkmark$$

$$7 + 20 = 27 \checkmark$$

$$27 = 20 + 7 \checkmark$$

$$27 = 7 + 20 \checkmark$$

30

$$30 + 0 = 30 \checkmark$$

$$0 + 30 = 30 \checkmark$$

$$30 = 0 + 30 \checkmark$$

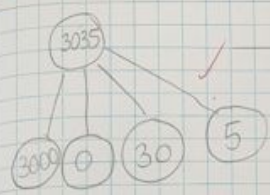
$$30 = 30 + 0 \checkmark$$

30 + 0 = 30 ✓

0 + 30 = 30 ✓

30 = 0 + 30 ✓

30 = 30 + 0 ✓



Th	H	T	O
3	0	3	5

There are three thousands 0 hundreds three tens and five ones.

I can identify number up to 100,000 and problem solved

21.09.22 PA

L.O.: To partition numbers to 10,000

Complete the number sentences.

Thousands	Hundreds	Tens	Ones
1000 1000 1000	100 100 100 100	10	1 1

$$3,412 = 3,000 + 400 + 10 + 2$$

Thousands	Hundreds	Tens	Ones
●● ●●	●●		●●●● ●●

$$4,308 = 4,000 + 300 + 0 + 8$$

Th	H	T	O
			●●



Kim can partition 4-digit number using part-whole models and place value chart.

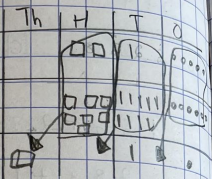
17.11.21 XVII T. XI - MMXXI
L.O.: To add with regrouping ones, tens and hundreds

$$\begin{array}{r} 897 \\ + 922 \\ \hline 1819 \end{array}$$

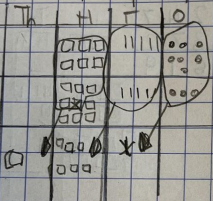


Challenge 3

$$\begin{array}{r} 215 \\ + 796 \\ \hline 1011 \end{array}$$



$$\begin{array}{r} 657 \\ + 943 \\ \hline 1600 \end{array}$$



$$\begin{array}{r} 1066 \\ + 753 \\ \hline 1819 \end{array}$$

$$\begin{array}{r} 1198 \\ + 622 \\ \hline 1820 \end{array}$$

$$\begin{array}{r} 3329 \\ + 1597 \\ \hline 4926 \end{array}$$

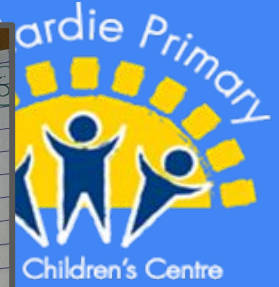
$$\begin{array}{r} 6258 \\ + 2937 \\ \hline 9195 \end{array}$$

$$\begin{array}{r} 3914 \\ + 86 \\ \hline 4000 \end{array}$$

$$\begin{array}{r} 3674 \\ + 1667 \\ \hline 5341 \end{array}$$

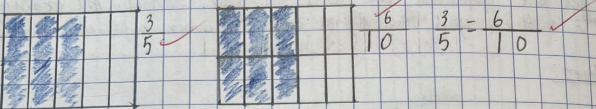
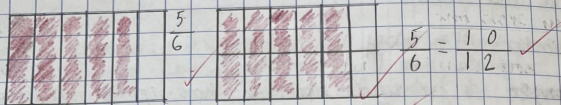
WWW: How pictures

EBI show how model part part whole and comparison



L.O. Equivalent fractions

$$\frac{10}{12}$$



What ^{are} equivalent fractions?

An equivalent fraction is two or more fractions that have the same value.

E.g. $\frac{1}{2}$ is equivalent to $\frac{2}{4}$, because half of 4 is 2.

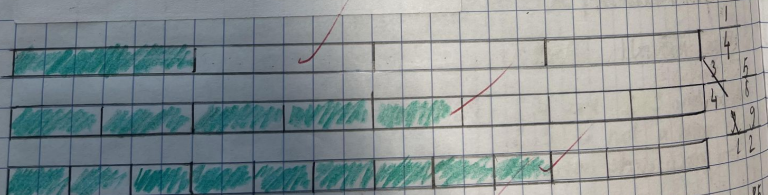
Ron is finding equivalent fractions to $\frac{1}{4}$



$\frac{1}{4}$ is equivalent to $\frac{5}{8}$ and $\frac{9}{12}$

Do you agree with Ron?
Draw a diagram to support your answer.
Compare answers with a partner.

I disagree with Ron because $\frac{9}{12}$ is equivalent to $\frac{3}{4}$, not $\frac{1}{4}$. Also $\frac{5}{8}$ cannot be simplified so we know that Ron's answer is incorrect. The fractions are not equivalent.



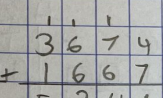
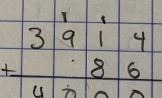
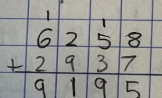
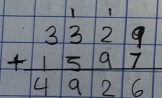
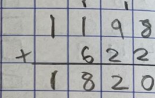
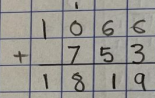
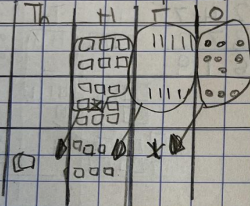
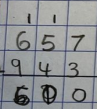
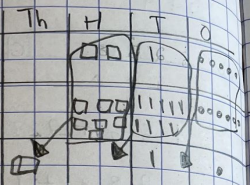
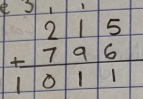
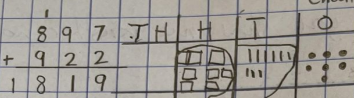
As can clearly be seen from the bar models above, $\frac{9}{12}$ and $\frac{5}{8}$ are not equivalent to $\frac{1}{4}$. Also, if you simplify $\frac{9}{12}$

PA

17. 11. 21. XVII. XI. MMXXI

L.O. To add with regrouping ones, tens and hundreds

Challenge 3



WWW: show pictorially

EBI show human model front, post, whole and commensurate

2 0/9/2 0 2 2
 X X/7 X/4/6 X Y 9 7

As To these numbers write 1 0 0 0 0

- In 42,653, the digit '4' is in the ten-thousands place.
- In 63,971, the digit '9' is in the hundreds place.
- In 20,974, the digit in the thousands place is 0.
- In 56,301, the value of the digit '3' is 300.
- In 70,569, the digit '7' stands for 70,000.
- In 81,466, the digit '1' stands for 1,000.

Maths Journal

Rosie is thinking of a 3-digit number.

She uses exactly 4 counters to make her number.

There are a different number of counters in each place value column.

There are two more counters in the ones than hundred

Variation 1

H	T	O
••	•	

This one fits the criteria that the number has different amount of counters in each column, but not that there are 2 more counters in the ones column than the hundreds.

Variation 2

H	T	O
	•••	•

This variation fits the criteria that there are 2 more ones than hundreds, but it is NOT a 3-digit number.

Variation 3

H	T	O
•		••

This variation fits the criteria that there is a different amount of counters in each column, that it's a 3-digit number, there are 2 more counters in the ones column than the hundreds column, and there are 4 counters.

the ones column than the hundreds column, and there are 4 counters.

E

Define the meaning of place value in your own words.
 When you put a number in a chart to see its value (300, 296 what is the '3' value? It is in the tens which makes it 30.)

20,0922

L.O: Compare and order integers.

+ 80,000 < half a million

Complete the sentences.

The missing number could be 200,000

The missing number cannot be more than 420,000

The missing number must be less than 420,000

200,000

800,000

400,000

The missing number must be less than 420,000

"50,700 is greater than 202,000 because 5 is greater than 2"

Explain the mistake Tay has made.

Tay's mistake is that the numbers in place value the second number has hundred thousands, but the first number has ten thousands.

Hh	Th	Tn	H	T	O
	5	6	7	0	0
2	0	4	0	0	0



Year 1



Year 2



Year 5



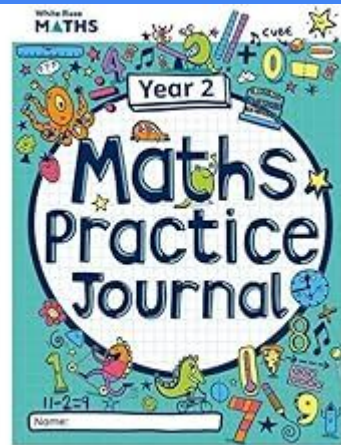
Year 6

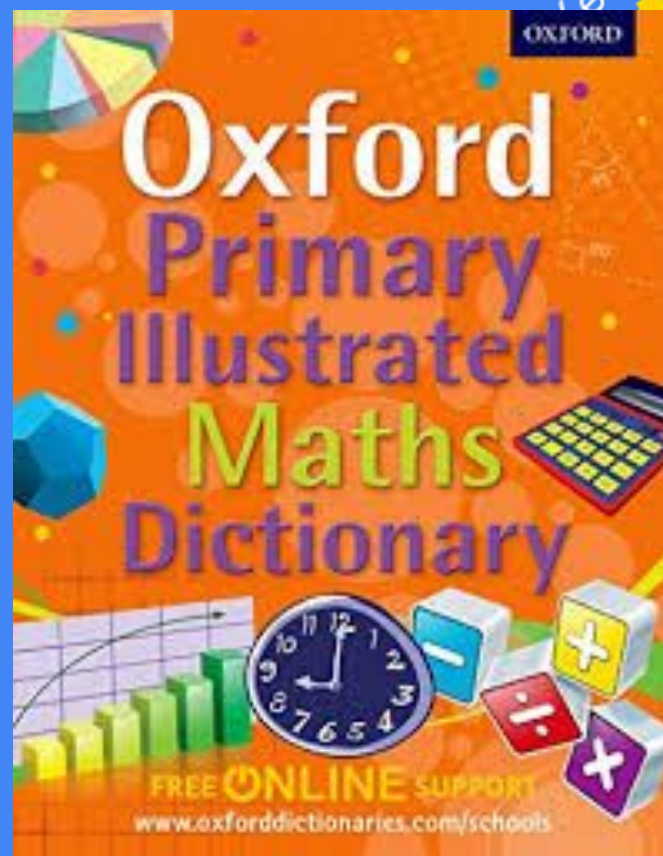
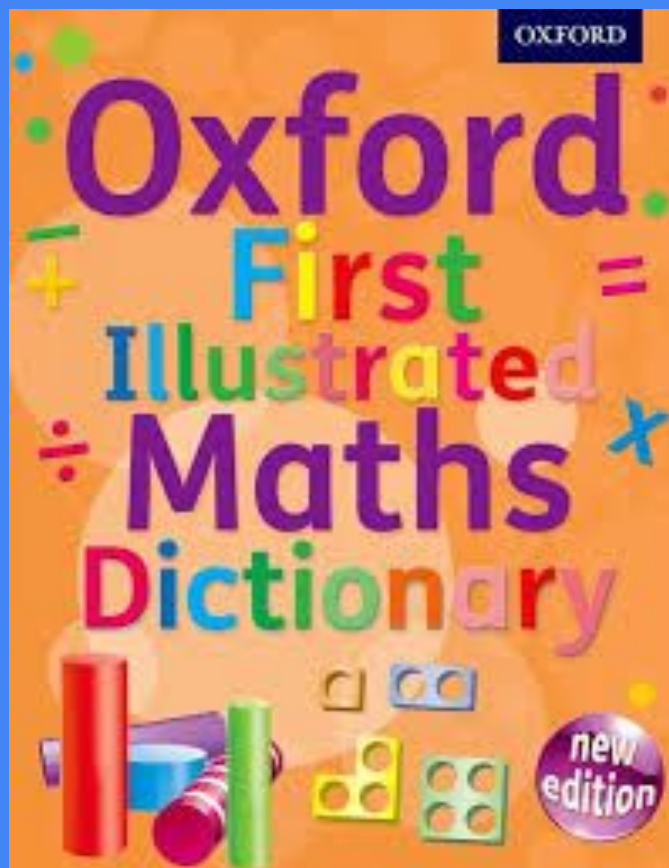


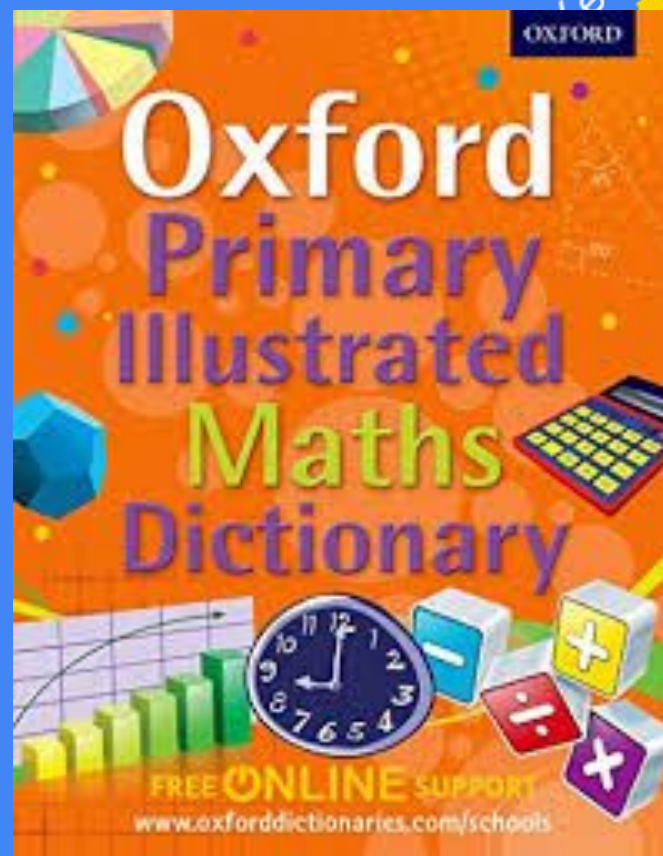
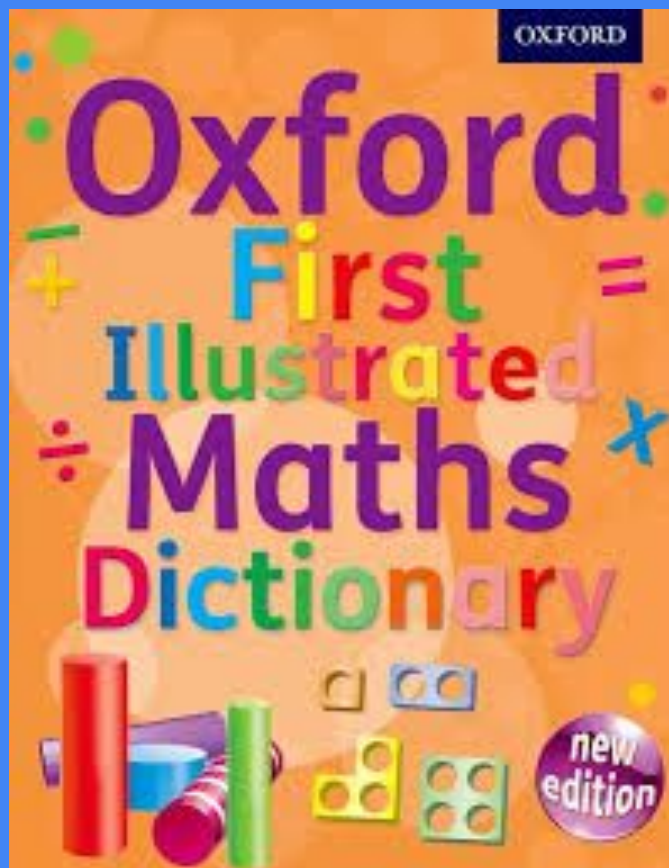
Year 3



Year 4









THANK YOU
FOR
YOUR
ATTENTION
ANY QUESTIONS?



Teaching for Mastery

Five Big Ideas

