

Fair, friendly, fulfilling, fun!

Maths Parent Presentation September 2023



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- -What is Mastery?
- -The maths curriculum
- -What does Maths Mastery look like across the school
- -An example of progression in calculation from
- Reception to year 6
- -Supporting your child at home
- -Time for questions

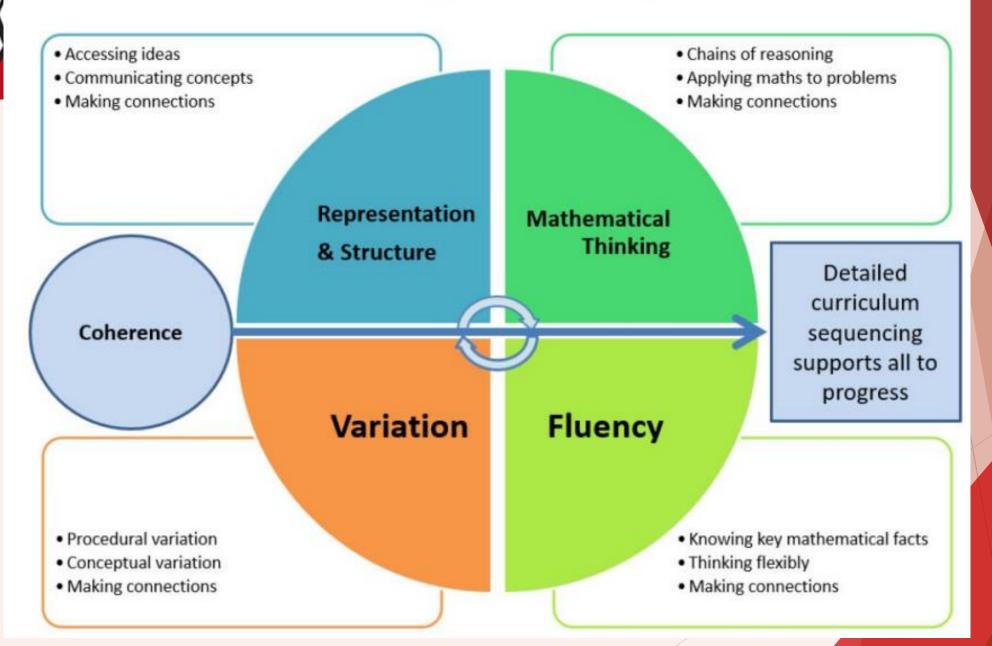


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What is Mastery?



Teaching for Mastery

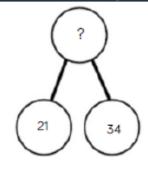




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Variation

Conceptual variation; different ways to ask children to solve 21 + 34



?					
21	34				

Word problems:

In year 3, there are 21 children and in year 4, there are 34 children. How many children in total?

21 + 34 = 55. Prove it

21

+34

21 + 34 =

= 21 + 34

Calculate the sum of twenty-one and thirty-four.

<u>66</u> 6	+	

Missing digit problems:

•	agin ig oight p	o o to i i i o .		
	10s	1s		
	0 0	0		
	0 0 0	?		
	?	5 -		



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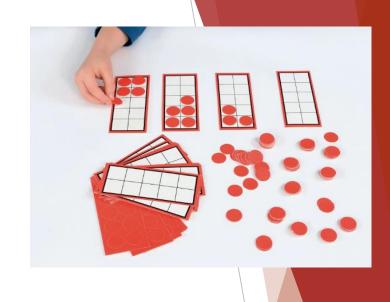
Representation and structure

Concrete









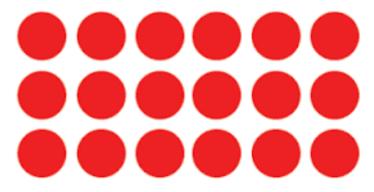


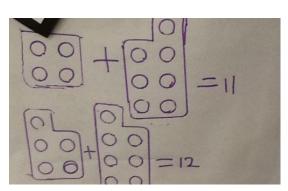


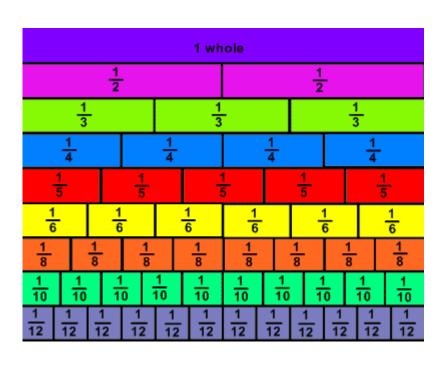
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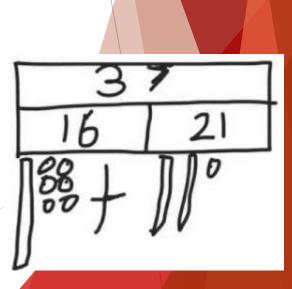
3	?						
7							

Pictorial











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Abstract

$$2 \times 5 = 10$$
 $66 + 32 = 98$
 $12 + \Box = 17$

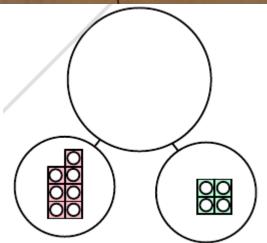


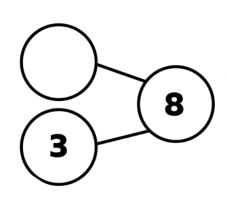
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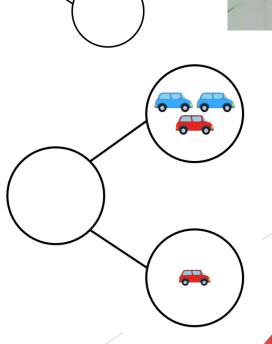
part whole part 3

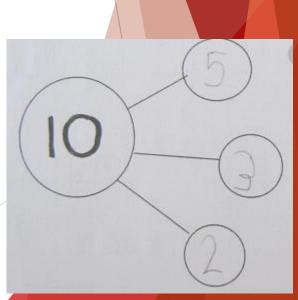
Part Part Whole





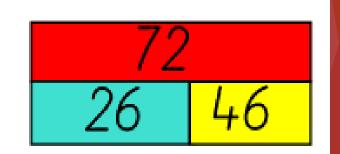




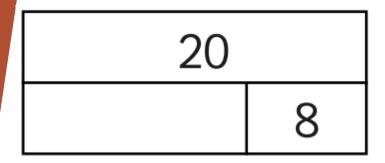




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Bar Model



In a class, 18 of the children are girls.

A quarter of the children in the class are boys.

Part-Part-Whole **Equal Parts of a Whole** Whole Whole Part Part Part Part Part Whole = Part x Number of Parts Whole = Part + Part Part = Whole ÷ Number of Parts Part = Whole - Part Number of Parts = Whole ÷ Part Comparison Part-Part-Whole and Comparison Α Whole Difference В Difference Whole = A + BDifference = A - BDifference = A - BA = B + Difference

Altogether, how many children are there in the class?



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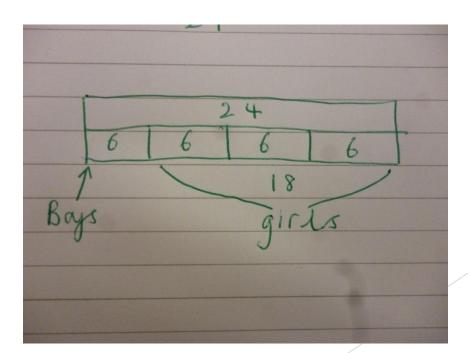
Bar Model

24

In a class, 18 of the children are girls.

A quarter of the children in the class are boys.

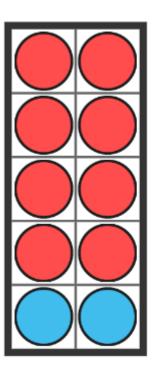
Altogether, how many children are there in the class?

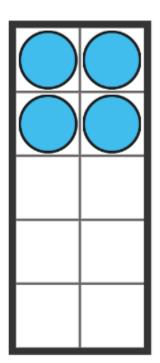


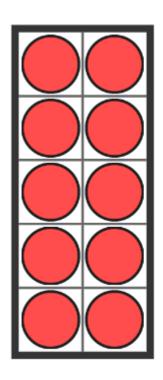


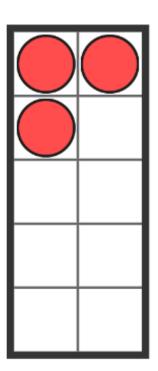
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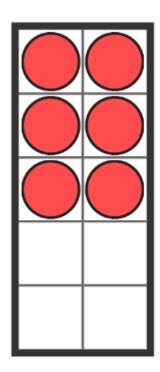
Tens Frames













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The Maths Curriculum

Focus on:

- -Fluency
- -Reasoning
- -Problem solving

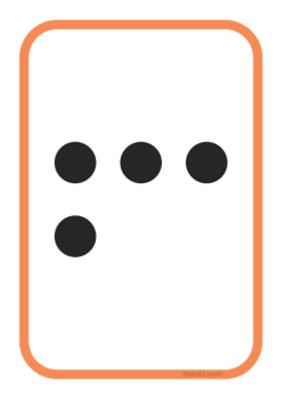


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<u>Fluency</u>

To be fluent in mathematics children should be able to...

- -grasp the fundamentals of mathematics
- practice arithmetic skills
- make connections
- become more confident with written and mental methods
- be confident with what they are doing and why
- recall and apply their knowledge rapidly and accurately

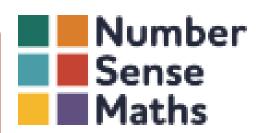






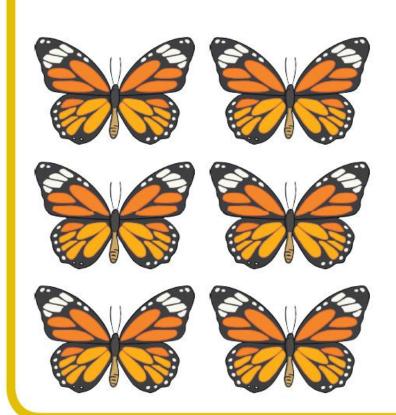
Subitising

Subitising is the ability to look at a small set of objects and instantly know how many there are without counting them. For example, when rolling a dice we don't need to count the dots to know what we have rolled.











Addition Grid Facts

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0 + 4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1 + 7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2 + 4	2 + 5	2 + 6	2 + 7	2+8	2 + 9	2+10
3	3+0	3+1	3 + 2	3+3	3 + 4	3 + 5	3+6	3 + 7	3+8	3+9	3 + 10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5 + 5	5+6	5 + 7	5+8	5+9	5 + 10
6	6+0	6+1	6 + 2	6+3	6 + 4	6 + 5	6+6	6 + 7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7 + 10
8	8+0	8+1	8+2	8+3	8+4	8 + 5	8+6	8 + 7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9 + 5	9+6	9+7	9+8	9+9	9+10
10	10 + 0	10 + 1	10 + 2	10 + 3	10 + 4	10 + 5	10 + 6	10 + 7	10 + 8	10 + 9	10 + 10

Subtraction Grid Facts

_	0	1	2	3	4	5	6	7	8	9	10
0	0-0										
1	1-0	1-1									
2	2 – 0	2-1	2 – 2								
3	3 – 0	3 – 1	3 – 2	3 – 3							
4	4 – 0	4-1	4 – 2	4 – 3	4 – 4						
5	5 – 0	5 – 1	5 – 2	5 – 3	5 – 4	5 – 5					
6	6 – 0	6 – 1	6 – 2	6 – 3	6 – 4	6 – 5	6 – 6				
7	7 – 0	7 – 1	7 – 2	7 – 3	7 – 4	7 – 5	7 – 6	7 – 7			
8	8 – 0	8-1	8 – 2	8 – 3	8 – 4	8 – 5	8 – 6	8 – 7	8 - 8		
9	9 – 0	9 – 1	9 – 2	9 – 3	9 – 4	9 – 5	9 – 6	9 – 7	9 – 8	9 – 9	
10	10 -0	10 – 1	10 – 2	10 – 3	10 – 4	10 – 5	10 – 6	10 – 7	10 – 8	10 – 9	10 – 10
11		11 – 1	11 – 2	11 - 3	11 – 4	11 – 5	11 – 6	11 -7	11 – 8	11 – 9	11 – 10
12			12 – 2	12 – 3	12 – 4	12 – 5	12 – 6	12 – 7	12 – 8	12 – 9	12 – 10
13				13 – 3	13 – 4	13 – 5	13 – 6	13 -7	13 – 8	13 – 9	13 – 10
14					14 – 4	14 – 5	14 – 6	14 - 7	14 – 8	14 – 9	14 – 10
15						15 – 5	15 – 6	15 – 7	15 – 8	15 – 9	15 – 10
16							16 – 6	16 – 7	16 – 8	16 – 9	16 – 10
17								17 – 7	17 – 8	17 – 9	17 – 10
18									18 – 8	18 - 9	18 – 10
19										19 - 9	19 - 10
20											20 - 10

Calculation Strategies







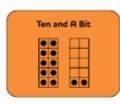


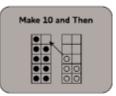




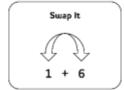














NSM Number Facts Calculation Strategies

One More, One Less	When we add one, we get the next counting number. When we subtract one, we get the previous counting	Number Neighbours: Spot the Difference	Adjacent numbers have a difference of 1. Adjacent odds and evens have a difference of 2.
1 2 3 4 5 6	number (e.g. 5 – 1 = 4).	#3# ### #3## ###	Spot number neighbours (adjacent, odds or evens) to solve subtractions of adjacent numbers (e.g. $5-4=1$), of adjacent odds (e.g. $9-7=2$) or adjacent evens (eg. $6-4=2$)
Two More, Two Less: Think Odds and Evens	If we add two to a number, we go from odd to next odd or even to next even. If we subtract two from a number, we go from odd to previous odd or even to previous even.	7 Tree and 9 Square	Use these visual images to remember addition and subtractions fact families that children can find tricky. For example, visualising the 7 tree helps remember that 7 – 3 = 4. Visualising the 9 square helps remember that 3 + 6 = 9.
Number 10 Fact Families 10 ? ?	Go beyond just recalling the pairs of numbers that add to 10. Make sure that we can also spot additions and subtractions which we can use number bonds to 10 to solve.	Ten and A Bit	The numbers $11-20$ are made up cf 'Ten and a Bit'. Recognising and understanding the 'Ten and a Bit' structure of these numbers enables addition and subtraction facts involving their constituent parts (e.g. $3+10=13$, $17-7=10$, $12-10=2$).
Five and A Bit	The numbers 6, 7, 8 and 9 are made up of 'five and a bit'. This can be shown on hands, and supports decomposition of these numbers into their five and a bit parts (e.g. $5 + 3 = 8$, $9 - 5 = 4$).	Make Ten and Then	Additions which cross the 10 boundary can be calculated by 'Making Ten' first, and then adding on the remaining amount (e.g. 8 + 6 can be calculated by thinking '8 + 2 = 10 and 4 more makes 14'). The same strategy can be applied to subtractions through 10.
Know about 0	When we add 0 to or subtract 0 from another number, the total remains the same. If we subtract a number from itself, the difference is 0.	Adjust It	Any addition and subtraction can be calculated by adjusting from a fact you know already, (e.g. 6 + 9 is one less than 6 + 10).
Doubles and Near Doubles	Memorise doubles of numbers to 10, using a visual approach. Then use these known double facts to calculate near doubles and hidden doubles. Once we know 6 + 6 = 12 then 6 +7 and 5 + 7 is easy.	Swap It 1 + 6	When the order of two numbers being added (addends) is exchanged the total remains the same. E.g. 1 + 8 = 8 + 1. Sometimes reversing the order of the two addends makes addition easier to think about conceptually.

2 times 4 times 9 times 3 times 5 times 6 times 7 times 8 times tables tables tables tables tables tables tables tables

$$7 \times 2 = 14$$
 $\left[7 \times 3 = 21 \right] \left[7 \times 4 = 28 \right] \left[7 \times 5 = 35 \right] \left[7 \times 6 = 42 \right] \left[7 \times 7 = 49 \right]$

$$9 \times 2 = 18$$
 $9 \times 3 = 27$ $9 \times 4 = 36$ $9 \times 5 = 45$ $9 \times 6 = 54$ $9 \times 7 = 63$ $9 \times 8 = 72$ $9 \times 9 = 81$

 $8 \times 8 = 64$





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Reasoning

Through reasoning problems children should...

- be able to explain why an answer is right or wrong
- follow a line of enquiry to a logical conclusion
- prove theories using mathematical language

Which would you rather have?
2 x 5 toys
or
5 x 2 toys

A quarter is when we share something into two equal pieces.

True or false?



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Problem Solving

Children should be able to...

- apply their mathematics to a variety of routine and non-routine situations
- put maths into context
- break down problems into a series of manageable steps

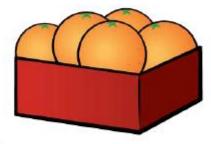


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Des has some oranges.

He packs them into boxes.

Each box holds 5 oranges.



He fills 7 boxes.

He has 29 oranges left.

How many oranges does he have in total?





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What does Mastery look like across the school?



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Mastery in Reception

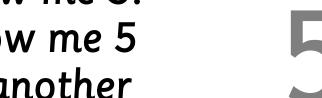




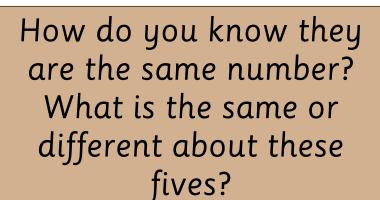


Mastering 5

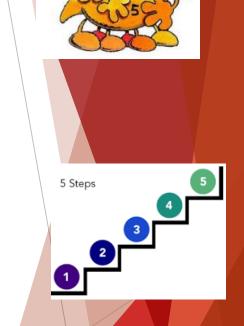
Show me 5. Show me 5 in another

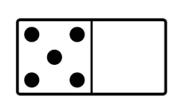


way?















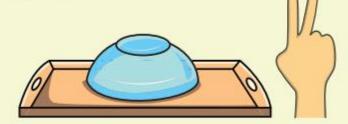
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These all show 2. True or false?



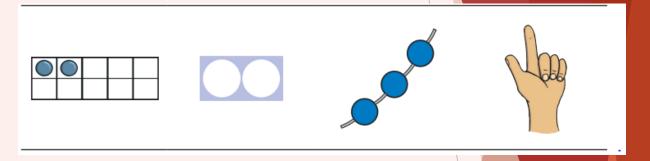
With children, count out 1, 2 or 3 items and hide them.

Ask children to use their fingers to show how many are hidden.

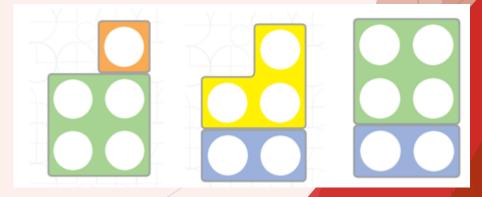


Ask children to watch as you add 1 more item to the hidden group.

How many are hidden now? What if you take one out?



Which one is the odd one out? Explain your ideas to a grown up.





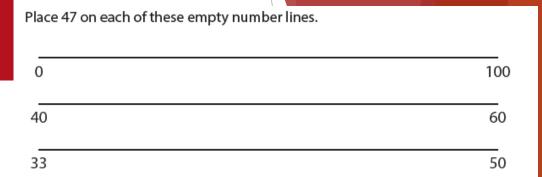
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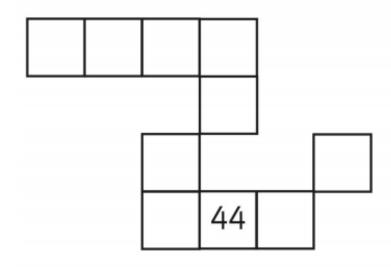
Mastery in years 1 and 2



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Mastery in years 1 and 2





Max labels an odd number on the number line. He spills some paint over his number.

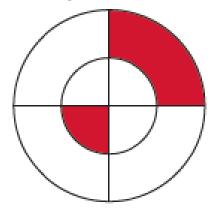
What could Max's number be?



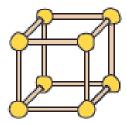
Mastery in years 1 and 2

What fraction is the red part of the whole circle?

Explain your reasoning.



Jack has made a cube using 12 sticks and 8 balls of modelling clay.



What shape could he make with:

6 sticks and 4 balls of clay?

4 long sticks, 8 short sticks 8 balls of clay?

Sam splits a rectangle into quarters.







To split the rectangle into quarters,
I have to draw three lines.

Do you agree with Sam? Explain your answer.



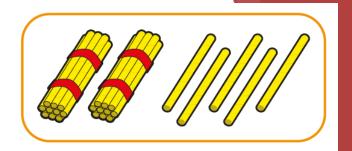


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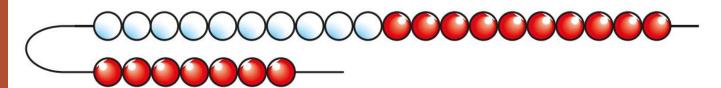
Mastery in years 3 and 4



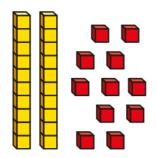
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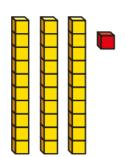


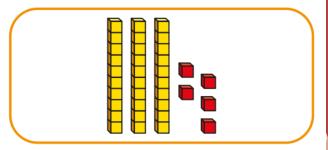
Mastery in years 3 and 4

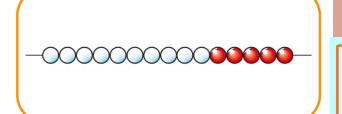


These two numbers are the same.









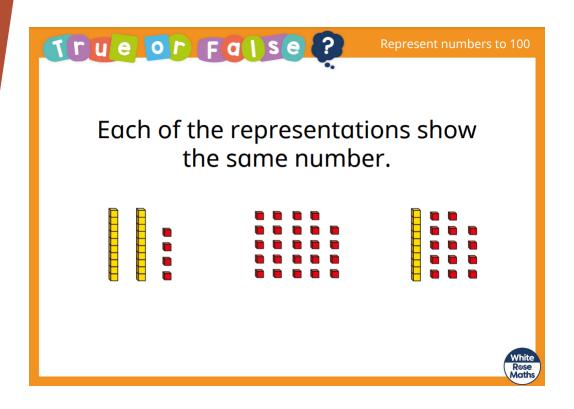
Key vocabulary
number
represent
represents
group
grouped
grouping
count
hundreds
tens
ones
how many?
value

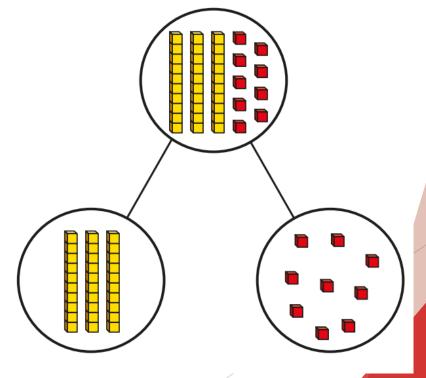
Explain why.



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Mastery in years 3 and 4





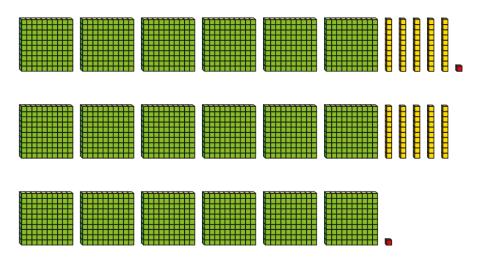
Key vocabulary
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value



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Mastery in years 3 and 4

What numbers are represented?



Use base 10 to represent each number.

362 326

306

360

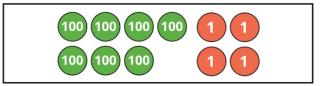
300

230

What numbers are represented?







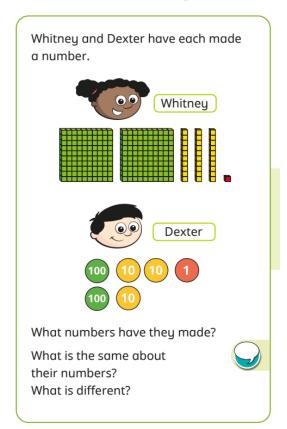


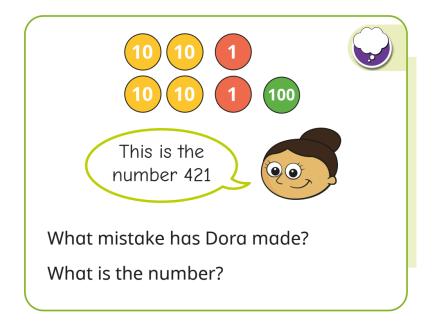
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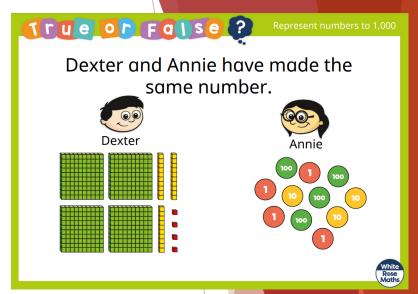


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Mastery in years 3 and 4







Key vocabulary
number
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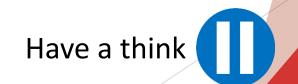


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Mastery in years 5 and 6

What number is shown in the place value chart?

Thousands			Ones		
Н	Т	0	Н	Т	0



What number is shown in the place value chart?

406,320 ,00 300 6,00 400,000 20 Thousands⁰ Ones Н Н

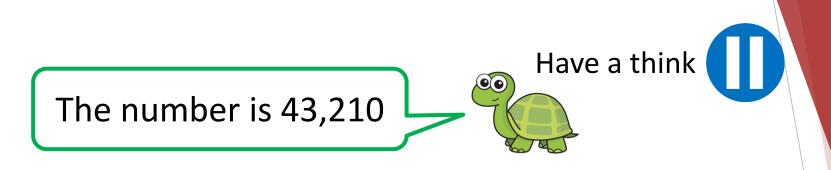
What number is shown in the place value chart?

406,320

Have a think

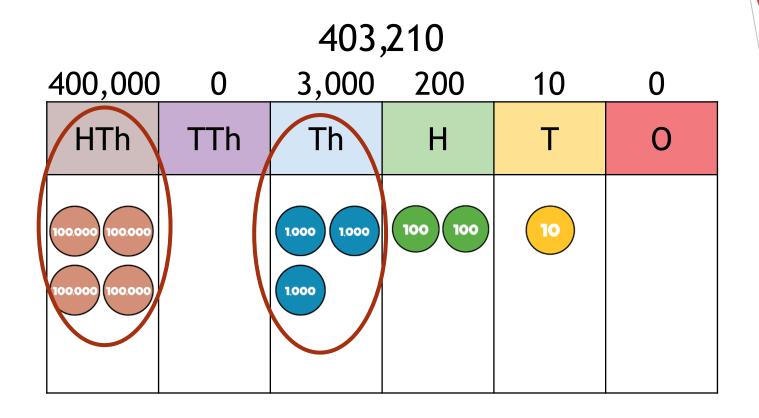
Thousands			Ones		
Н	T	0	Н	Т	0

What will the number be if you add three counters to the ten-thousands column? 436,320



HTh	TTh	Th	Ι	Т	0
100,000 100,000		1.000	100 100	10	

What mistake has Tiny made?



Tiny did not include 0 as a place holder in the ten-thousand column.

Have a go at questions 1 - 4 on the worksheet

Rosie is thinking of a 6-digit number.

The greatest digit has the largest possible value. The second digit is double the last digit. The first and last digits add up to 11 The last 3 digits add up to 14 The value of the digit in the thousands column is 3 The value of the digit in the hundreds column is 7

What is Rosie's number?

HTh	TTh	Th	Н	Т	0
9	4	3	7	5	2

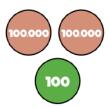
943,752

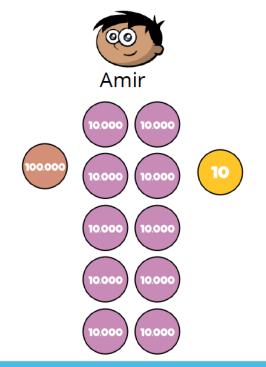
White Rose Maths



Alex and Amir have represented the same number.









False

Alex has represented 200,100

Amir has represented 200,010



1)
$$300 + 4 + 10,000 =$$

- 3) What does ascending mean?
- 4) What does descending mean?

```
1) 300 + 4 + 10,000 =
```

1) 300 + 4 + 10,000 = 10,304

- 3) What does ascending mean?
- 4) What does descending mean?

2)
$$C = 100$$

 $I = 1$
 $X = 10$
 $V = 5$

- 3) What does ascending mean? Increasing in size
- 4) What does descending mean? Decreasing in size



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Questioning

Why?
What happens if....?
How do you know?
Will that always happen?
Can you prove it to me?



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Our Maths Calculation Policy



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Year 1 - 6
Calculation Policy
Addition and Subtraction

#MathsEveryoneCan

White
Rese

Year 1 - 6

Calculation Policy
Multiplication and Division

#MathsEveryoneCan

White
Rose
Maths



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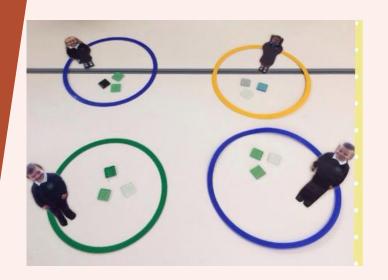
Calculation progression examples

Multiplication from year R to 6

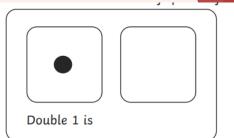


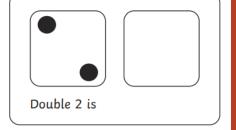
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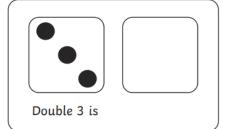
Pearl Class

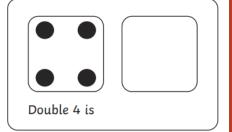


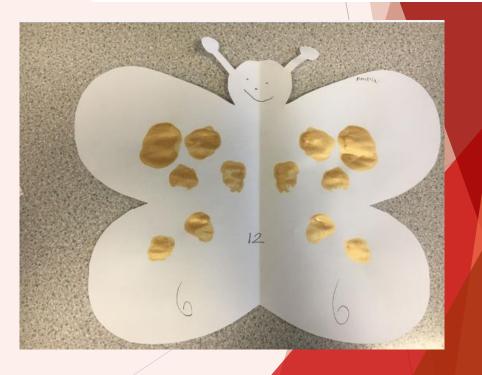












Multiplication in Year 1 – Summer









Use cubes and a range of containers such as bun trays, egg boxes and paint pallets.





Allow children to explore using the cubes and discuss all the different ways to fill the containers.

There are _____ rows/columns.

There are ____ cubes in each row/column.

Circle each row of sweets.







Make this array.



Complete the sentences.

a) There are counters in each row.

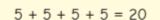
There are rows.

There are counters altogether.

Kim and Mo write number sentences to match the array.







Kim



4 + 4 + 4 + 4 + 4 = 20

Mo

Who is correct?

Explain your answer.



How many rows are there?

Multiplication in Year 2

Complete the sentences to match the picture.



There are _____ water bottles.

Can you see a different repeated addition and multiplication in the picture?

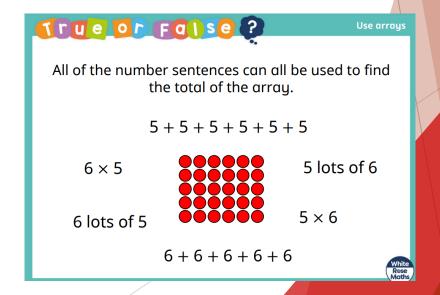
Draw dots to show each multiplication in two ways. The first one has been done for you.

Multiplication	Array 1	Array 2
3 × 8	•••••	•••
2 × 5		
4 × 9		
6 × 1		

Complete the table.

The first one has been done for you.

Addition	Multiplication
2 + 2 + 2 + 2	4 × 2
5 + 5 + 5	
3+3+3+3+3	
	2 × 10



Challenges – problem solving

Draw an array to show 7×3

Complete the number sentence.

Is there more than one way to draw the array?

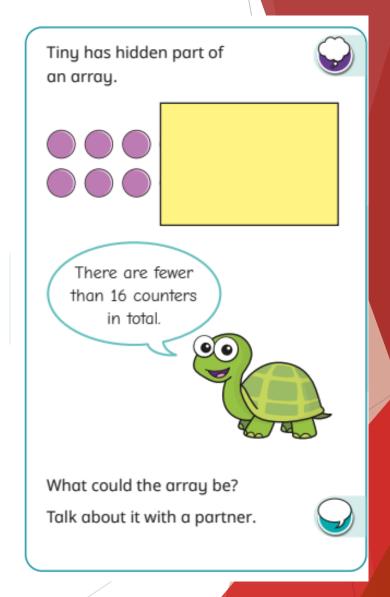
The answer to a multiplication question is 18



What could the multiplication be?



How many possible questions can you find?





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 $3 \text{ tens} \times 2 = \underline{\qquad} \text{ tens}$

2 ones × 2 = _____ ones

32 × 2 = _____

Sapphire Class

Complete the number sentences.

Use the place value chart to help you.

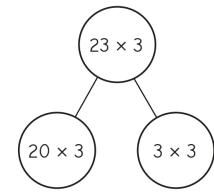
Tens	Ones

How many people can fit on 3 minibuses?

Use a place value chart and base 10 to help you.

Key vocabulary partition product same / different equal multiple multiplying how many represents digit sum column method efficient

Ron has used a part-whole model to multiply 23 by 3



$$20 \times 3 = 60$$

 $3 \times 3 = 9$
 $23 \times 3 = 69$

Work out the multiplications.

 32×3

23 × 2

12 × 4

41 × 2

Use a part-whole model to help you work out the multiplications.

21 × 5

42 × 2

52 × 2

21 × 6



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Sapphire Class

 Dora uses place value counters alongside the written multiplication to work out 34 × 2

Tens	Ones
10 10 10	1111
10 10 10	1111

	Τ	0	
	3	4	
×		2	
		8	
	6	0	
	6	8	

$$(4 \times 2 = 8)$$

 $(30 \times 2 = 60)$

Use Dora's method to work out the multiplications.

 Jo uses place value counters to work out 24 × 3

Tens	Ones
10 10	1111
10 10	1111
10 10	0000

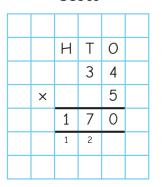
H T 0

x 3 1 2 6 0

Use Jo's method to work out the multiplications.

18 × 3

Scott



What is the same about their methods?

 (4×5)

 (30×5)

Brett and Scott have each worked out 34 × 5

Brett

HTO

3

5 0

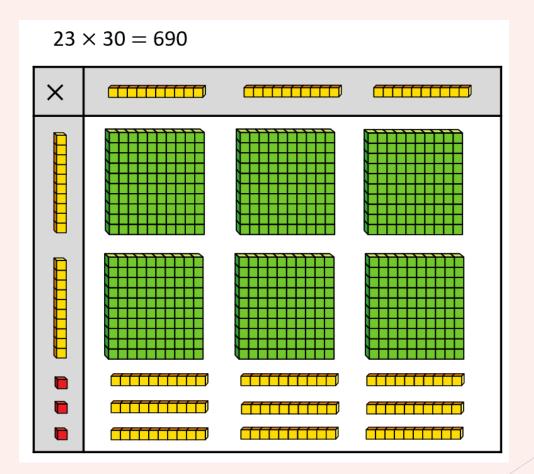
2 0

- What is different about their methods?
- Whose method is more efficient?

Key vocabulary partition product same / different equal multiple multiplying how many represents digit sum column method efficient



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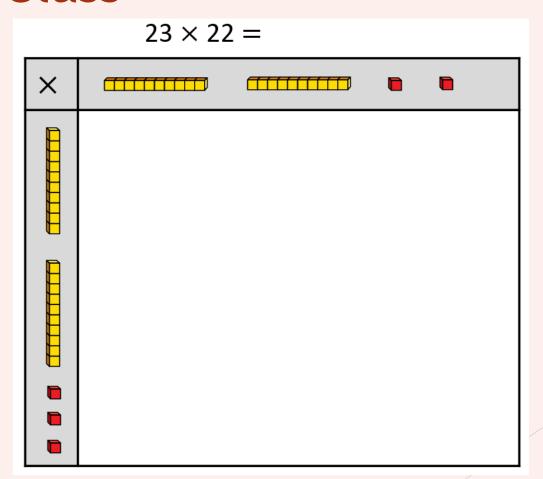


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	$23 \times 22 =$
×	

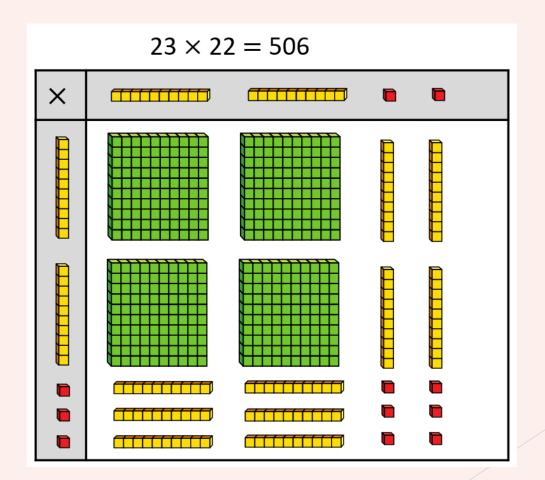


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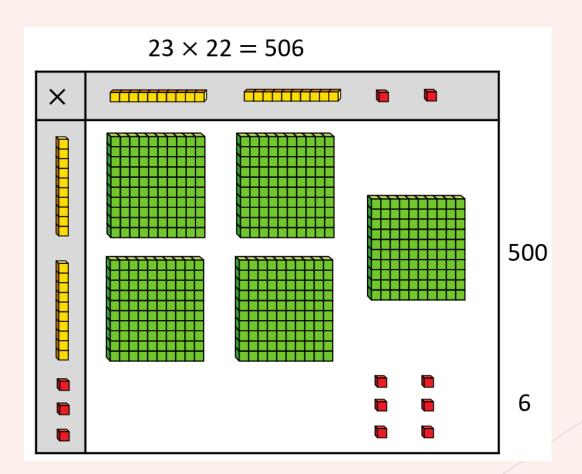


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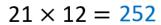
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Emerald Class



×	10 10	
<u>ं</u>	100 100	10
	10 10	1

×	20	1
10	200	10
2	40	2

$$200 + 40 + 10 + 2 = 252$$

What is the same?

What is different?



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$$22 \times 13 =$$

×	



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Emerald Class

 $22 \times 13 = 286$

×	20	2
10	200	20
3	60	6



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22	~	31
Z	\wedge	2T

×	20	3	
30	600	90	
1	20	3	

$$600 + 90 + 20 + 3 = 713$$

	Н	Т	0	
		2	3	
×		3	1	
			3	

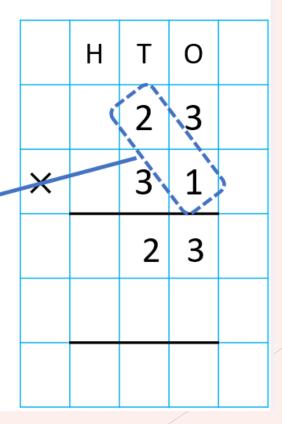


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23	X	31

×	20	3
30	600	90
1	20	3

$$600 + 90 + 20 + 3 = 713$$





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Emerald Class

 23×31

×	20	3
30	600	90
1	20	3

$$600 + 90 + 20 + 3 = 713$$

	Н	Т	0	
		2	3	
×	Ţ	(3)	, <u>í</u>	
		2	3	
		9	0	



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	23 × 31							
	20	3			Н	Т	0	
×	20	3				2	3	
30	600 ←	90		×		3	1	
1	20	3				2	3	
					6	9	0	
600	600 + 90 + 20 + 3 = 713							



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Emerald Class

 23×31

×	20	3
30	600	90
1	20	3

$$600 + 90 + 20 + 3 = 713$$

	Н	Т	0	
		2	3	
×		3	1	
		2	3	
+	6	9	0	
	7	1	3	



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How can you support your child with maths at home?



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Key Instant Recall Facts – KIRFs



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Key Instant Recall Facts - KIRF:

- Termly objectives
- Years Reception to 6
- Improve children's fluency
- Instant recall of facts

What are the best ways to work on these facts?



Key Instant Recall Facts

Year 1 – Autumn 1

I can count, read and write numbers to 100

By the end of this half term, children should know the following facts. The aim is for them to recall these facts **instantly**.

- I can count forwards to 100
- I can count in ones starting at any number up to 100
- I can count backwards from 100
- I can count backwards from 100 starting at any number
- I can write numbers to 100
- I can recognise numbers to 100

Key vocabulary

Forwards Backwards

Top Tips

The secret to success is practising little and often. Use time wisely. Can you practise these KIRFs while walking to school or during a car journey? You don't need to practise them all at once: perhaps you could have a fact of the day.

 $\underline{\text{Use practical resources}}$ – Grab handfuls of pasta or buttons and ask your child to count them



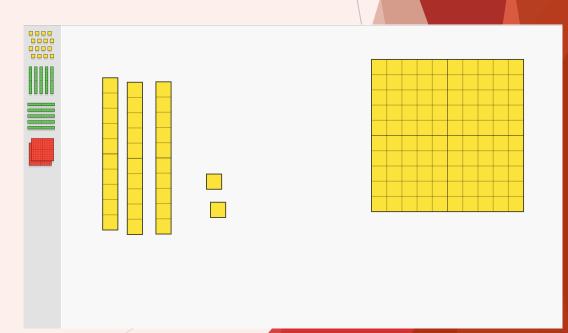
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On the website

A list of websites which can be used to support home learning









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Questions and time to explore resources

But first, please fill out our evaluation!

Thank you very much for coming