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What is Mastery?

Means that learning is sufficiently:

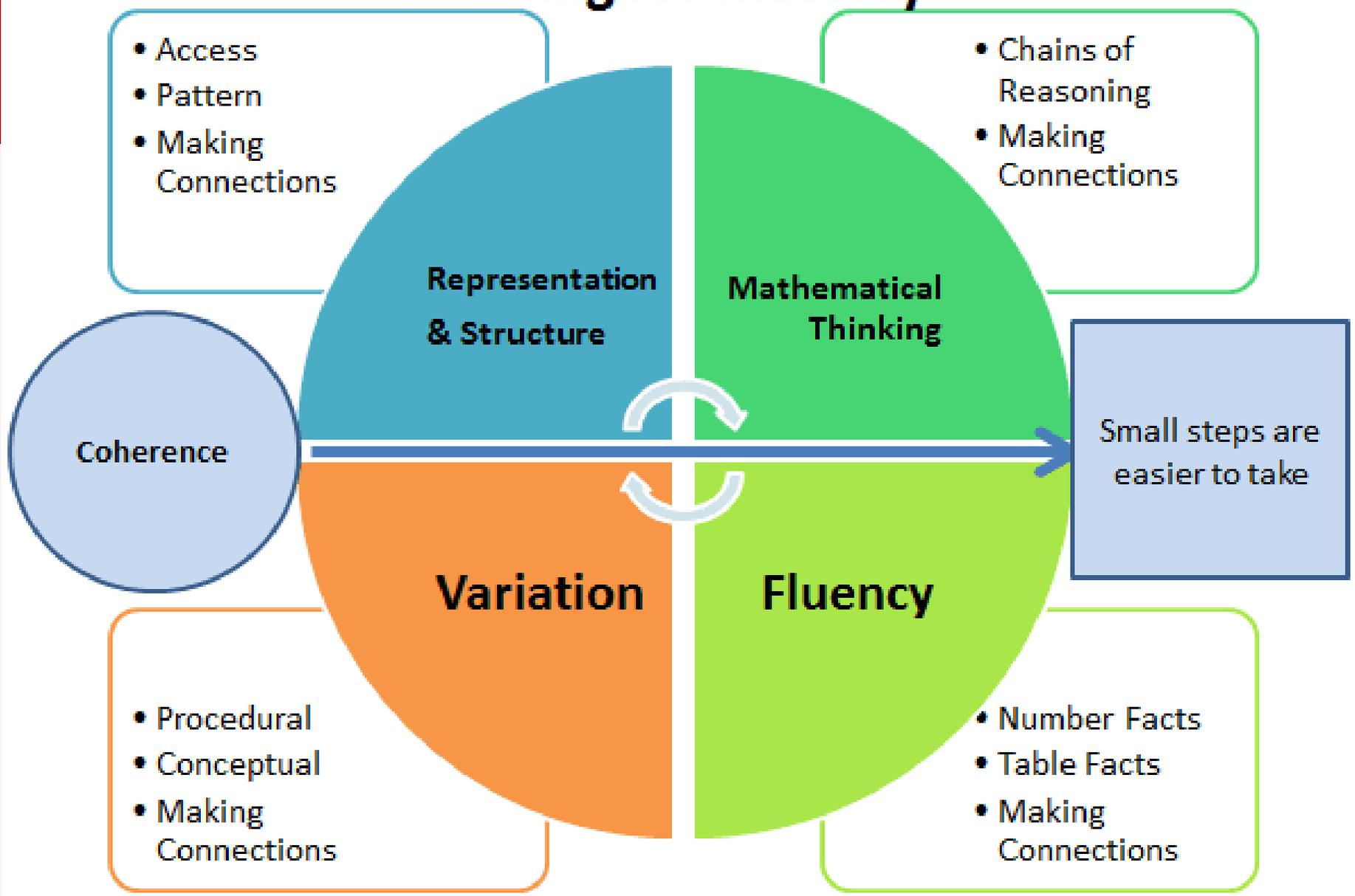
- Embedded
- Deep
- Connected
- Fluent

In order for it to be:

- Sustained
- Built upon
- Connected to



Teaching for Mastery



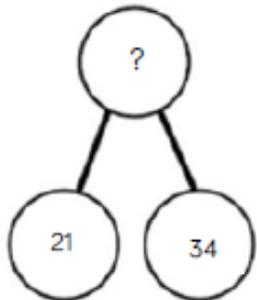


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Variation

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?

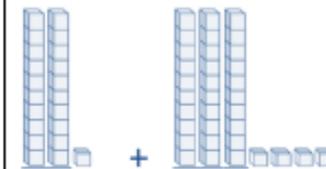
$21 + 34 = 55$. Prove it

$$\begin{array}{r} 21 \\ +34 \\ \hline \end{array}$$

$$21 + 34 =$$

$$\square = 21 + 34$$

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



Missing digit problems:

10s	1s
	?
?	5



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Supporting children's mathematical understanding

Concrete



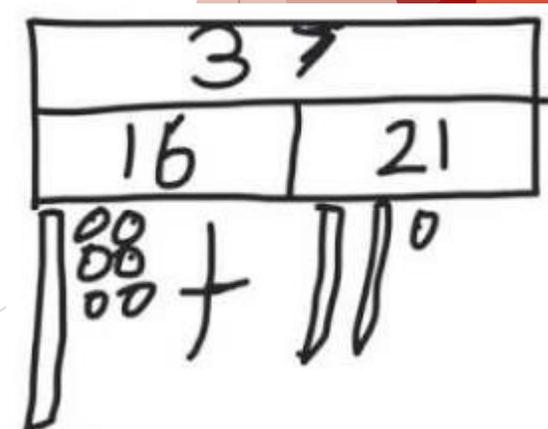
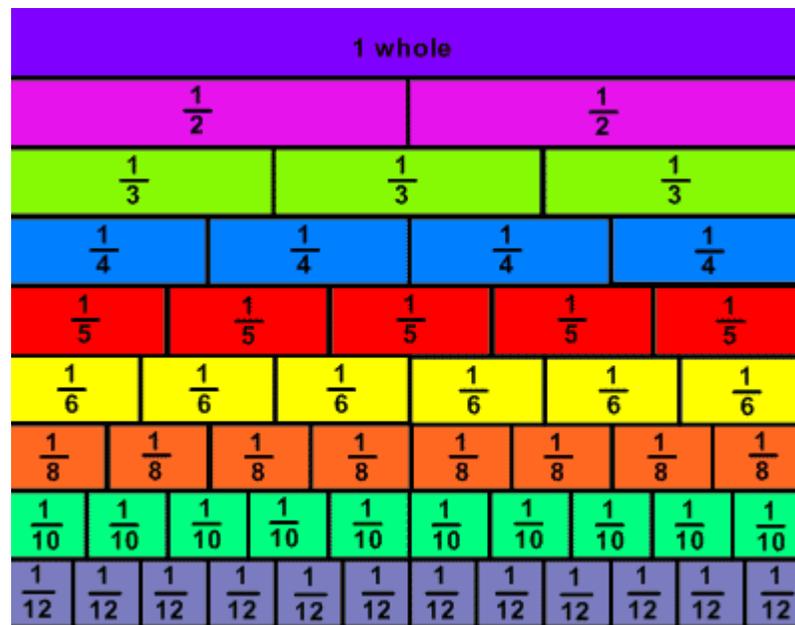
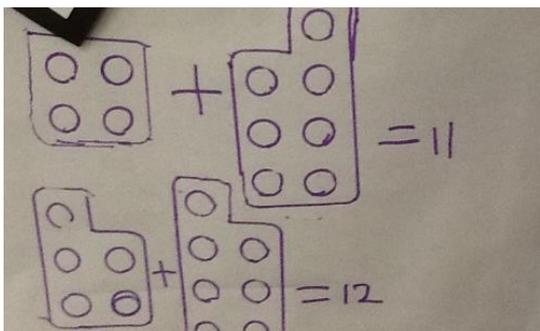
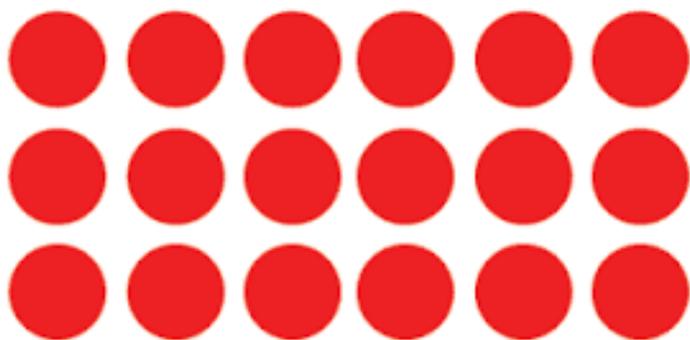


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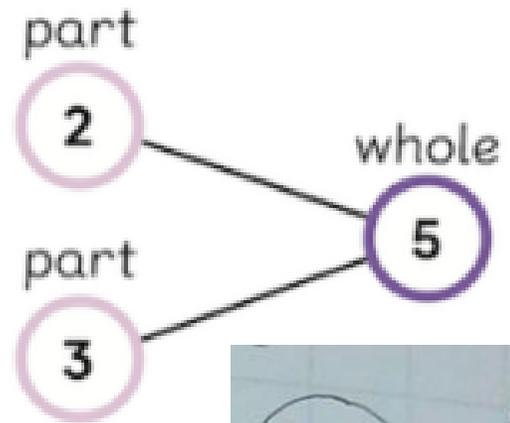
3	?
7	

Pictorial

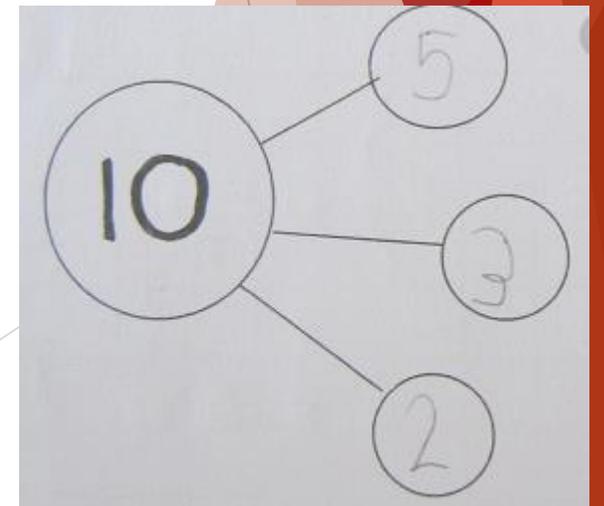
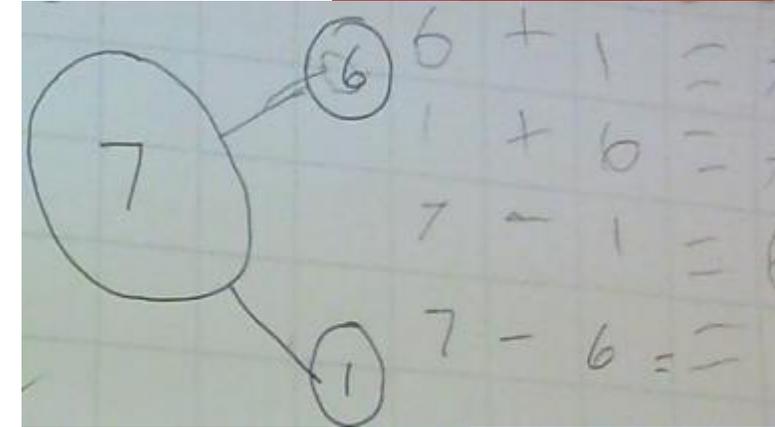
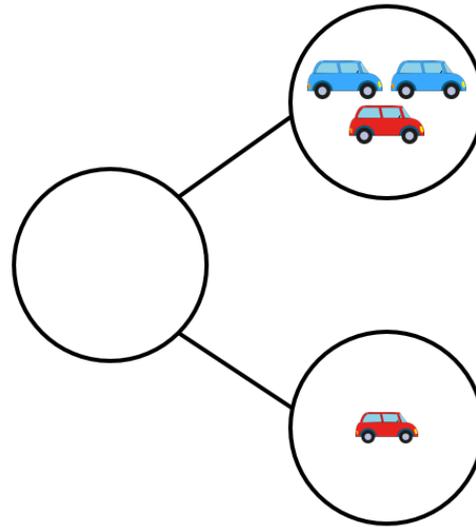
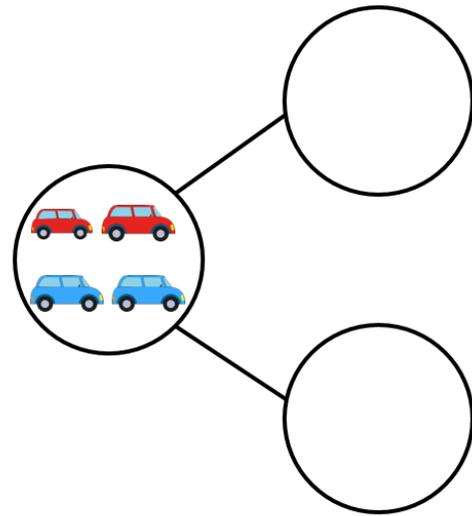
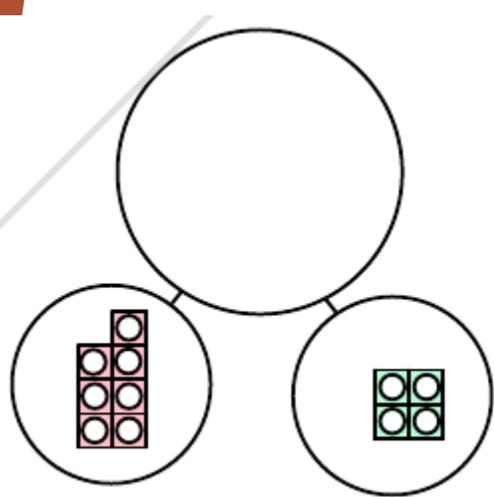


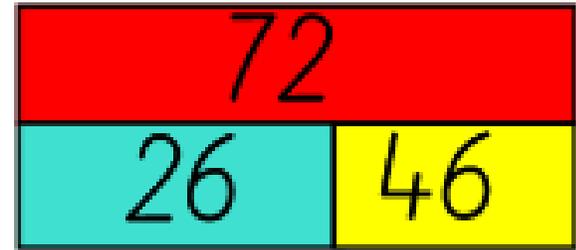


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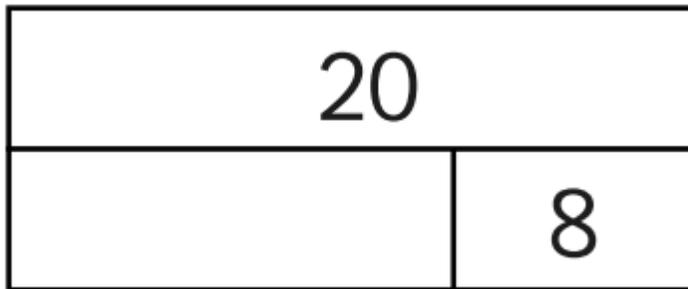


Part Part Whole





Bar Model

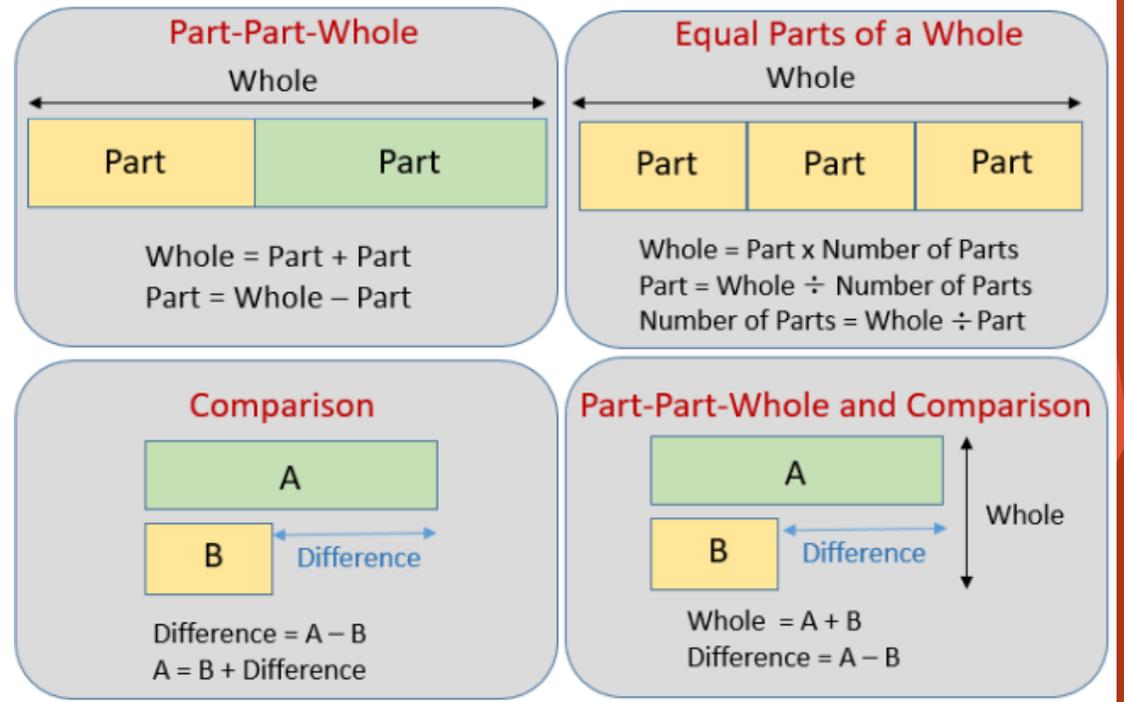


24

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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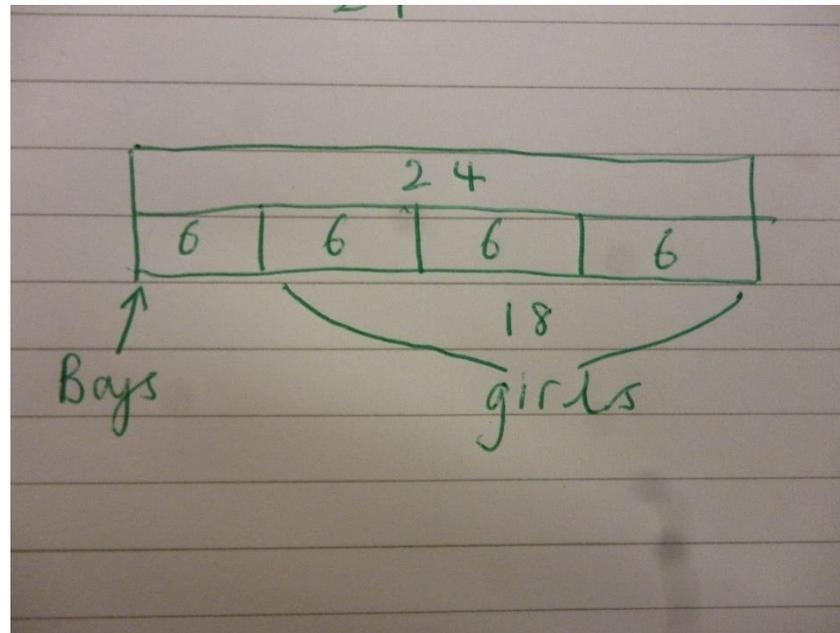
Bar Model

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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Abstract

$$2 \times 5 = 10$$

$$66 + 32 = 98$$

$$12 + \square = 17$$



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What does mastery look like
across the school?



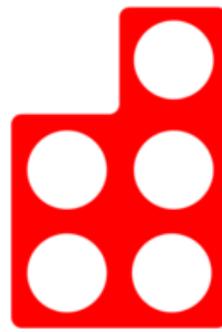
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Mastery in Reception



Sarah



Number of the Week

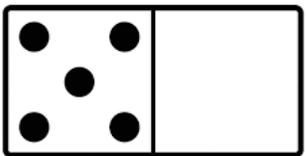


Show me 5.
Show me 5
in another
way?

5



How do you know they
are the same number?
What is the same or
different about these 5's?



Becoming the Master of 5!

Counting:

- Count everything once.
- Say the numbers in the correct order.
- You can count any collection of objects whether real or imaginary.
- It doesn't matter what order you count

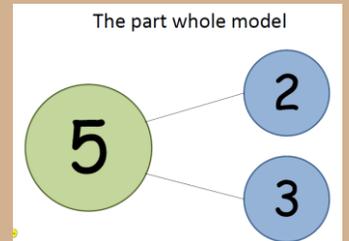
Cardinality:

- The last number you say is how many there are

The 5 C's

Composition -

- Seeing numbers in numbers!



Conservation:

- However you move the objects the number doesn't change.

Subitising:

- Recognising 5 in structured and unstructured ways.

Comparison -

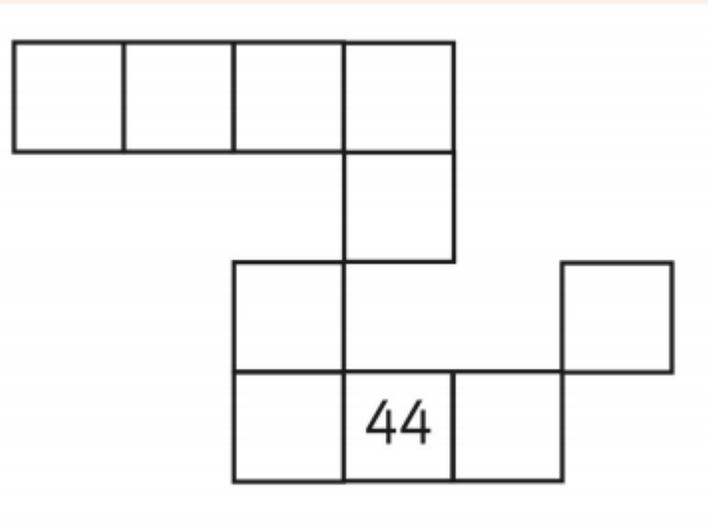
- Who has the most / fewest?
- How many apples are in the fruit bowl, or how many do you think will fit in the bowl?



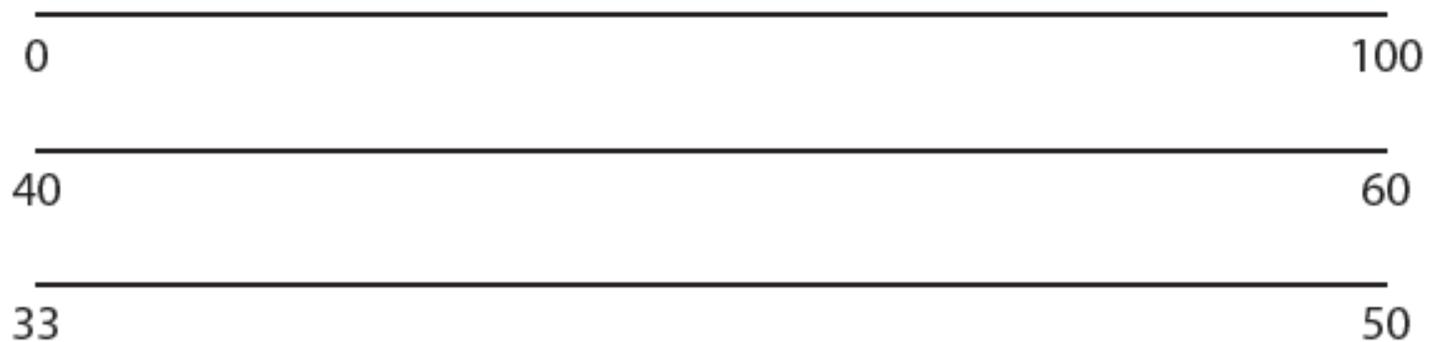
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Mastery in years 1 and 2



Place 47 on each of these empty number lines.



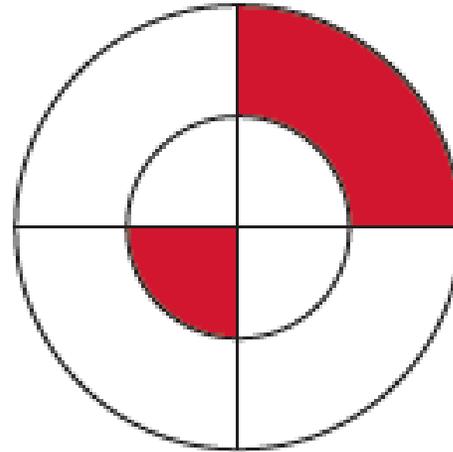


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What fraction is the red part of the whole circle?

Explain your reasoning.



Fill in the missing numbers. What do you notice?

27	
15	?

12	15
?	

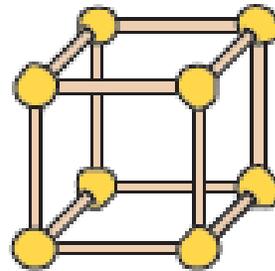
37	
15	?

23	14
?	

13	14
?	

57	
15	?

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?



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Mastery in years 3 and 4

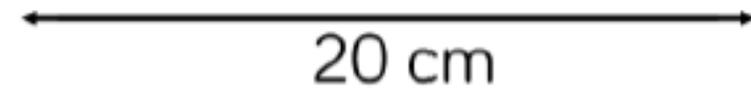
Here is a blue strip of paper.



An orange strip is four times as long.



The strips are joined end to end.



How long is the blue strip?

How long is the orange strip?

Explain how you know.

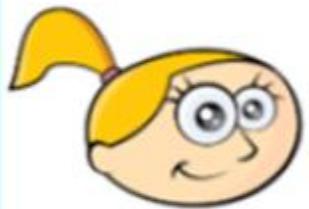


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Mastery in years 5 and 6

Eva says,



To multiply 23 by 57 I just need to calculate 20×50 and 3×7 and then add the totals.

What mistake has Eva made?
Explain your answer.

$$22 \times 111 = 2442$$

$$23 \times 111 = 2553$$

$$24 \times 111 = 2664$$

What do you think the answer to 25×111 will be?

What do you notice?

Does this always work?



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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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The Maths Curriculum

Focus on:

- Fluency
- Reasoning
- Problem solving



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Fluency

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



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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



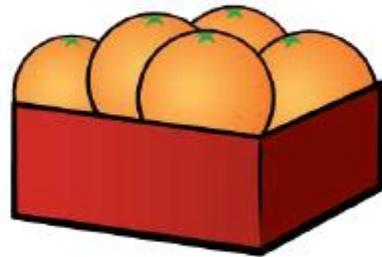
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I Des has some oranges.

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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Our Maths Calculation Policy

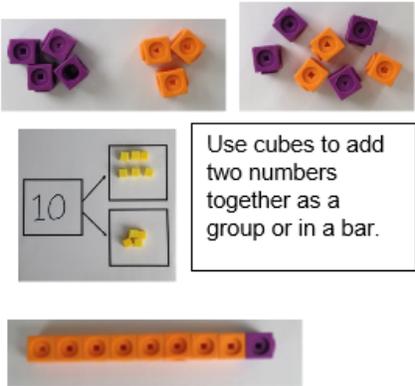
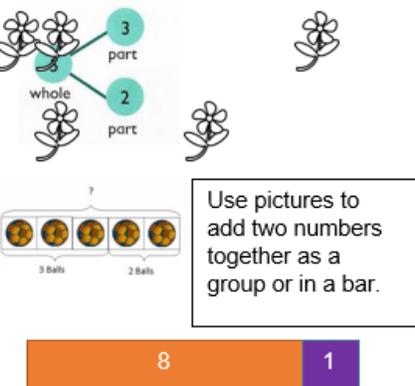
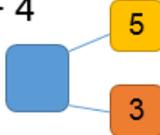
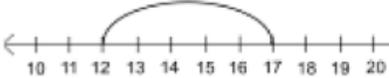


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Progression in Calculations

Addition

Objective and Strategies	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part-whole model	 <p>Use cubes to add two numbers together as a group or in a bar.</p>	 <p>Use pictures to add two numbers together as a group or in a bar.</p>	$4 + 3 = 7$ $10 = 6 + 4$  <p>Use the part-part whole diagram as shown above to move into the abstract.</p>
Starting at the bigger number and counting on	 <p>Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.</p>	$12 + 5 = 17$  <p>Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p>	$5 + 12 = 17$ <p>Place the larger number in your head and count on the smaller number to find your answer.</p>



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Calculation progression examples

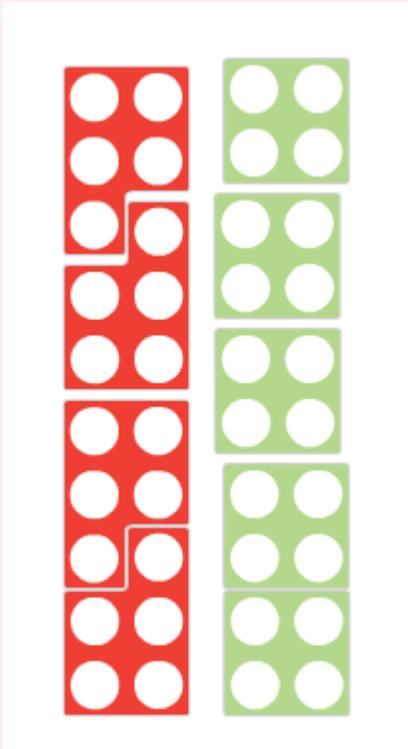
Multiplication from year 1 to 6



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Ruby Class



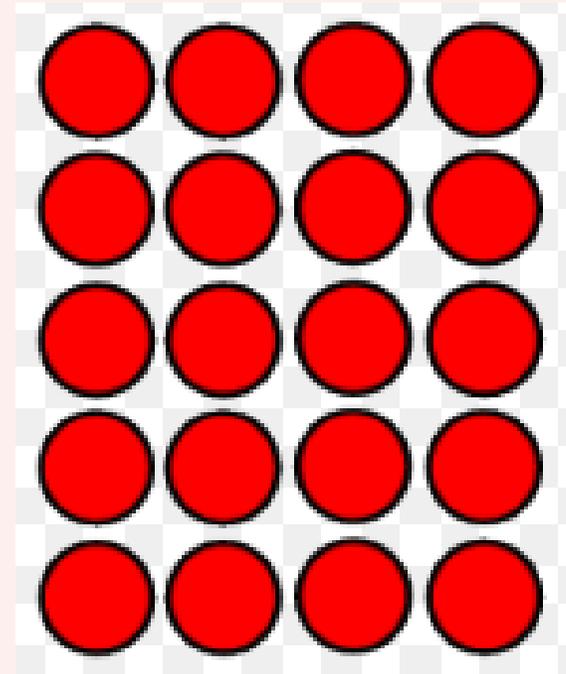
$$4+4+4+4+4$$

$$5+5+5+5$$

$$4 \times 5 = 5 \times 4$$

$$20 \div 5 = 4$$

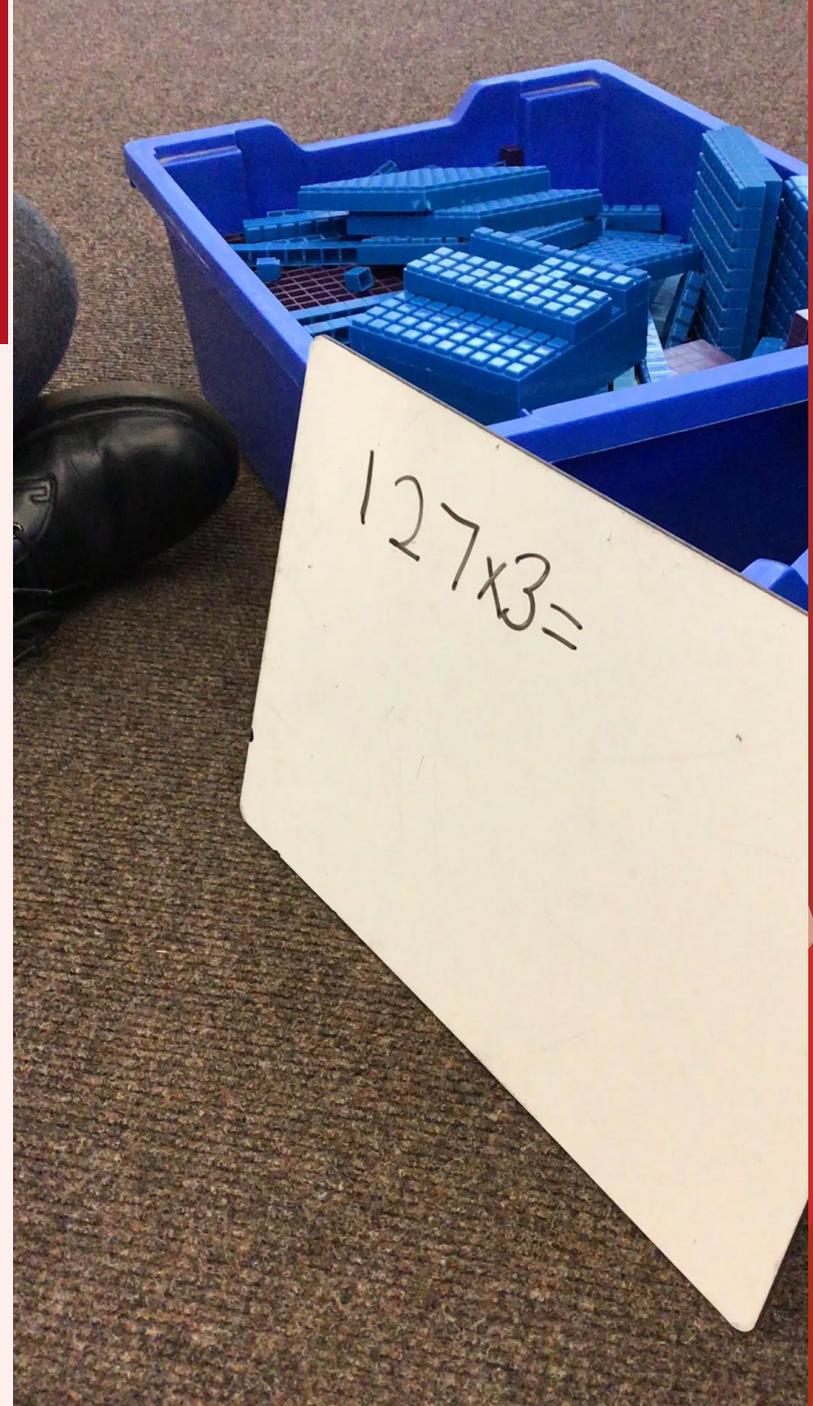
$$20 \div 4 = 5$$





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Sapphire Class





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Emerald Class



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Mental strategies

- Partitioning
- Near doubles
- Bridging through 10
- Near a multiple of 10
- Near 10 e.g adding 9 or 11
- Using multiples
- Inverse

On the website

- A list of mental methods used and taught for each year group
- A maths glossary of terms from Key Stage One to Key Stage Three



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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 - KIRFs

- 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.

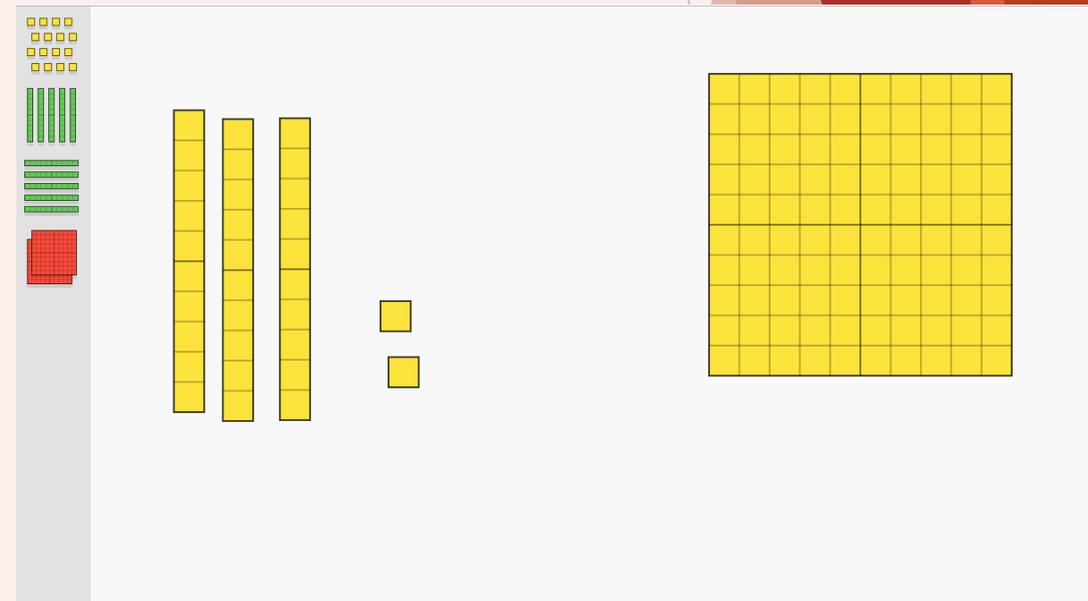
Use practical resources - Grab handfuls of pasta or buttons and ask your child to count them



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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