Maths Mastery Parent Information Session

Trinity CE Primary School

Thursday 7th May
Emma Cahill
Nick Clarke

The purpose of this session is to explain how we use Maths Mastery in our maths teaching.

Session overview

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Today we will be talking about:

- Maths Mastery - what is it and what does it look like?
- How we teach maths at Trinity
- What parents and carers can do to support children at home.

There will be an opportunity to ask questions at the end of the session

Or

Please feel free to ask any questions during the session.

Who are Mrs Cahill and Mr Clarke?

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"My Dad showed me this way".
Of course, Dad has got the best intentions, but using a different/efficient method will add confusion.

"I'll never use this in real life."
Children often don't see the connection yet, so motivation drops

"It's the teacher/school's responsibility."
Support at home—even simple encouragement—makes a big difference

"I was never good at maths either."
This can unintentionally pass on the idea that maths ability is inherited or fixed.

"They just don't have the brain for it."
This reinforces a fixed mindset and lowers expectations.

"My tutor told me to borrow from this number".
Other people involved in the learning who may not be up to date with current maths teaching or are using different methods to the school

"I'm just not a maths person."
This is one of the biggest mindset traps. It suggests ability is fixed rather than something you can improve with practice.

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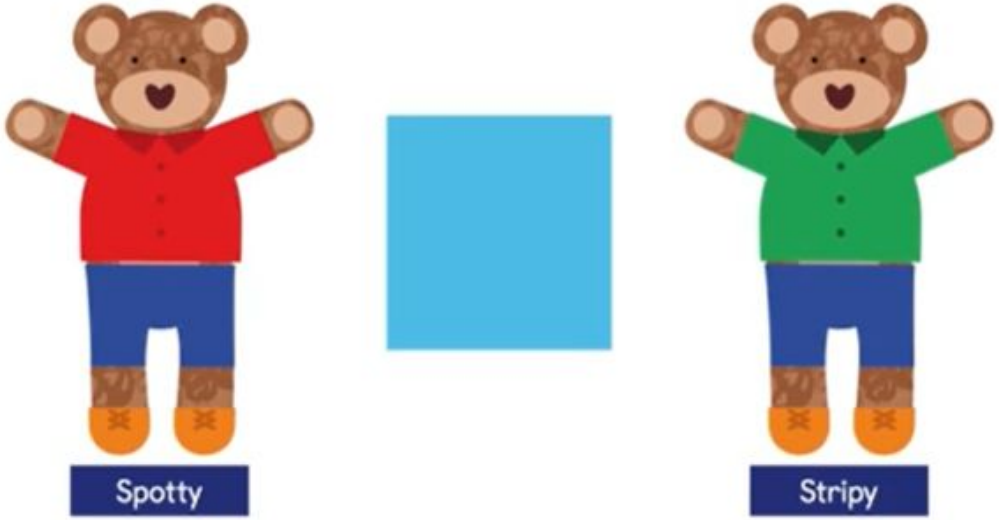
EQUAL PARTS PROBLEM



Stripy and Spotty decide to share this square equally.
How many ways can they do this?

EQUAL PARTS

This is one way

This is another way

Where does this idea of maths mastery come from?

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Top 10 High-Performing Countries in Math

Rank	Country	Score
1	China	591
2	Singapore	569
3	Macao (China)	558
4	Hong Kong (China)	551
5	Taiwan	531
6	Japan	527
7	South Korea	526
8	Estonia	523
9	Netherlands	519
10	Poland	516

Cockcroft Report 1982

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The Trinity road to mastery

At Trinity we have high expectations for all our children and want them to leave school with a good mathematical understanding. We began our journey towards developing a mastery approach in Autumn 2019. Through mastery, children not only become fluent in mathematical processes, but learn to reason and problem solve too. We aim to promote confidence and competence with a secure understanding of numbers and the number system.

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We want children to see how mathematics links to their everyday life. This prepares children for using mathematics in their future and to develop their resilience when facing new problems. We hope that through rich mathematical teaching and through mastery will promote enjoyment in a lively, exciting and stimulating environment in which the children can learn and enjoy maths. Our central component is the 5 big ideas that underpin the teaching of mastery: coherence, representation and structure, mathematical thinking, fluency and variation.

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The steps undertaken to develop mastery at Trinity

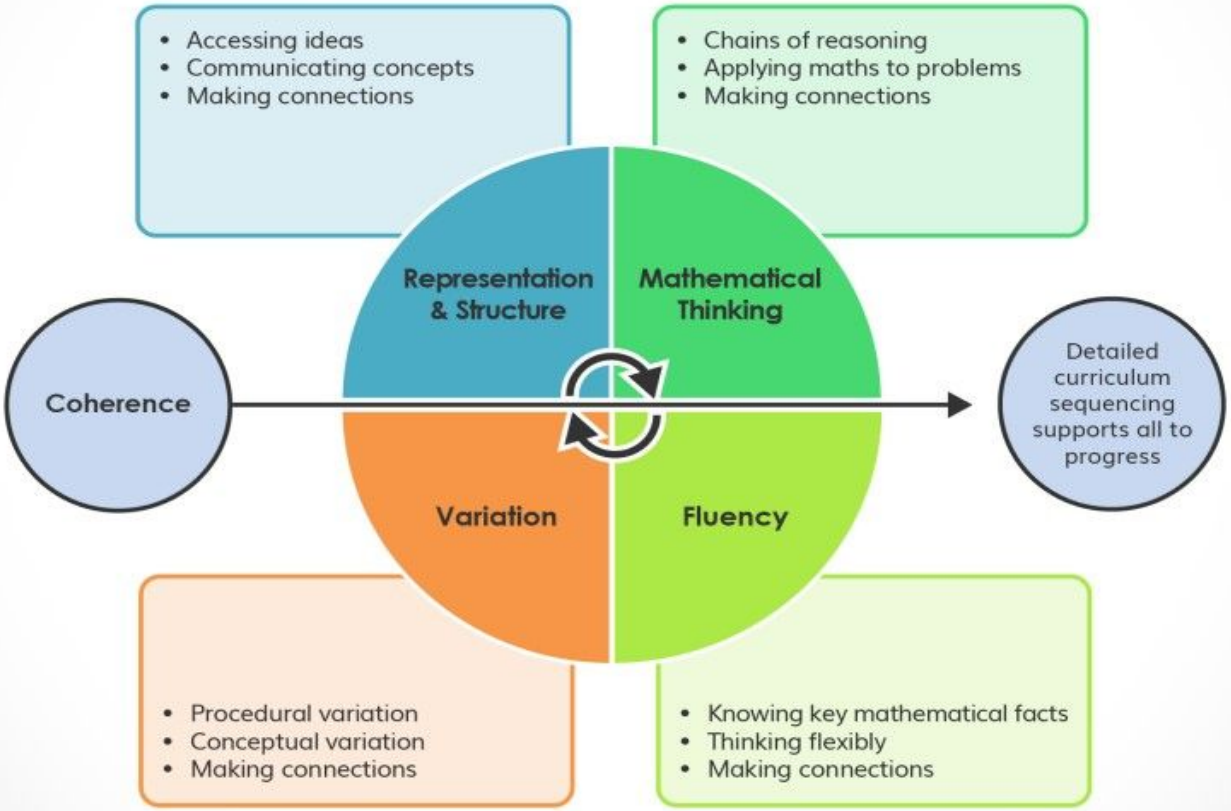
Working with our local maths hub.

MATHSHUBS BUCKS, BERKS AND OXON

We have completed the Mastery Development Programme, the Mastery Embedding Programme and have participated in the Primary Teaching for Mastery Sustaining Programme. We have also run the Mastering Number Programme in KS1.

Teaching for Mastery

Five Big Ideas



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NCETM
NATIONAL CENTRE FOR EXCELLENCE IN THE TEACHING OF MATHEMATICS

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The Essence of Mathematics Teaching for Mastery

Underpinning principles, lesson design, and how mastery works in the classroom

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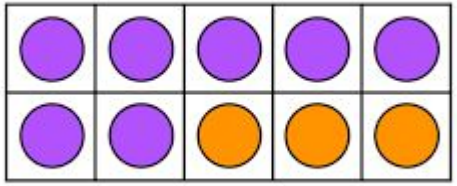
Underpinning principles

Mathematics teaching for mastery assumes everyone can learn and enjoy mathematics.

Mathematical learning behaviours are developed such that pupils focus and engage fully as learners who reason and seek to make connections.

Teachers continually develop their specialist knowledge for teaching mathematics, working collaboratively to refine and improve their teaching.



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Lesson design

Lesson design links to prior learning to ensure all can access the new learning.

Examples, representations and models are carefully selected to expose the structure of mathematical concepts and emphasise connections, enabling pupils to develop a deep knowledge of mathematics.

It is recognised that practice is a vital part of learning, but the practice must be designed to both reinforce pupils' procedural fluency and develop their understanding.

E.G.

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COHERENCE

Lessons are broken down into small connected steps that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts (NCETM, 2019).

Overview

Small Steps

- Part-whole model
- Addition symbol
- Fact families – addition facts
- Find number bonds for numbers within 10
- Systematic methods for number bonds within 10
- Number bonds to 10
- Compare number bonds
- Addition – adding together
- Addition – adding more
- Finding a part
- Subtraction – taking away, how many left? Crossing out
- Subtraction – taking away, how many left? Introducing the subtraction symbol
- Subtraction – finding a part, breaking apart
- Fact families – the 8 facts
- Subtraction – counting back

NC Objectives

Represent and use number bonds and related subtraction facts within 10

Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs.

Add and subtract one digit numbers to 10, including zero.

Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations and missing number problems.

Four objectives are covered over 12 small steps.

In the classroom

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Pupils are taught through whole-class interactive teaching, enabling all to master the concepts..

In a typical lesson, the teacher leads back-and-forth interaction, including questioning, short tasks, explanation, demonstration, and discussion, enabling pupils to think, reason and apply their knowledge to solve problems.

Use of precise mathematical language enables all pupils to communicate their reasoning and thinking effectively.

If a pupil fails to grasp a concept or procedure, this is identified quickly and addressed systematically to prevent them falling behind.

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Significant time is spent developing deep understanding of the key ideas that are needed to underpin future learning.

Key mathematical facts are learned deeply and practised regularly, to avoid cognitive overload in working memory and enable pupils to focus on new learning.

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The 5 big ideas.

Let's look at Variation.

Concrete, Pictorial and Abstract.

The CPA approach

CONCRETE

Children might begin by handling real objects...

...then using physical representations of them.

PICTORIAL

Drawings act as a bridge between the concrete objects children have been using and the abstract symbols they must learn to use.

Finally, children learn to use abstract symbols to solve problems.

$$10 + 7 = 17$$

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CPA – CONCRETE STEP

Concrete is the 'doing stage'. During this stage, children use concrete objects to model problems.

Unlike traditional maths teaching methods where teachers demonstrate how to solve a problem, the CPA approach brings concepts to life by allowing children to experience and handle physical (concrete) objects.

SOME OF THE CONCRETE RESOURCES THAT WE USE IN SCHOOL

MULTILINK CUBES

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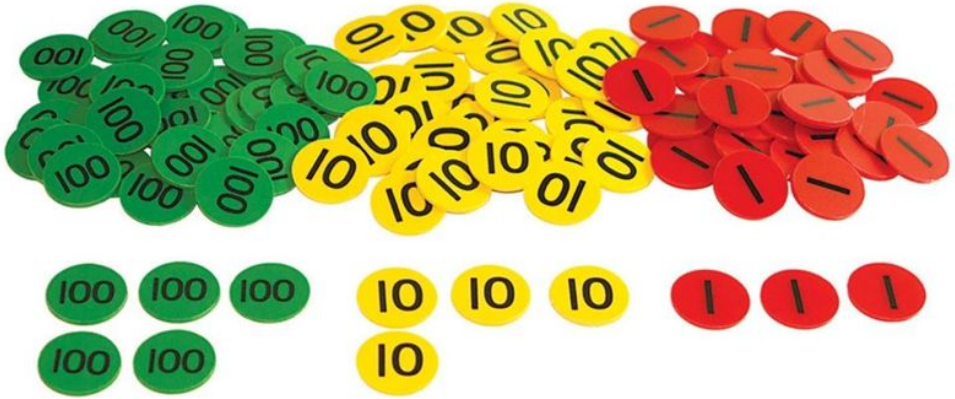
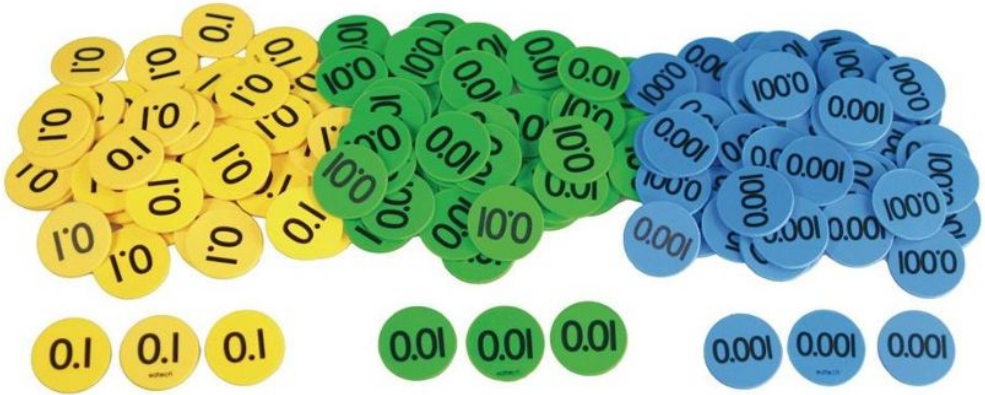
SOME OF THE CONCRETE RESOURCES THAT WE USE IN SCHOOL

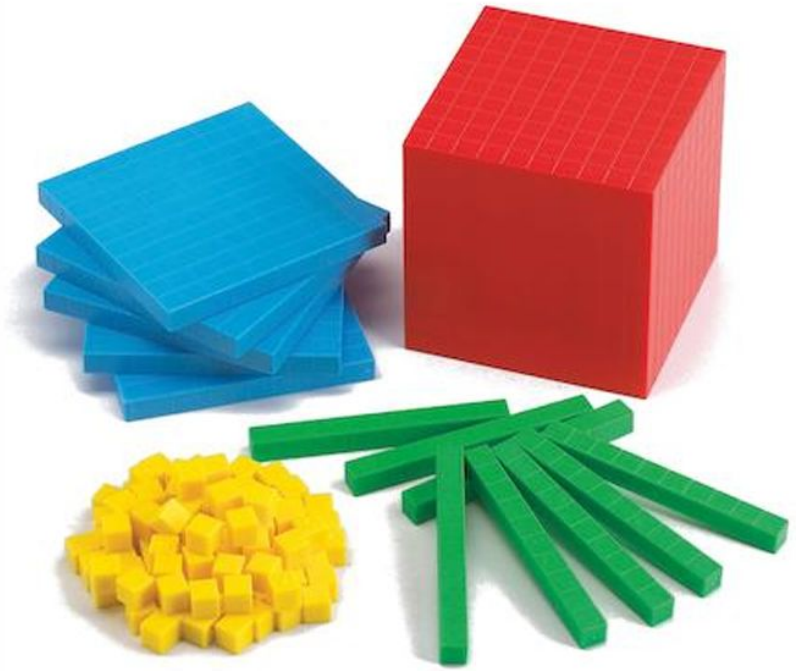
PLACE VALUE COUNTERS





SOME OF THE CONCRETE RESOURCES THAT WE USE IN SCHOOL

BASE 10 EQUIPMENT



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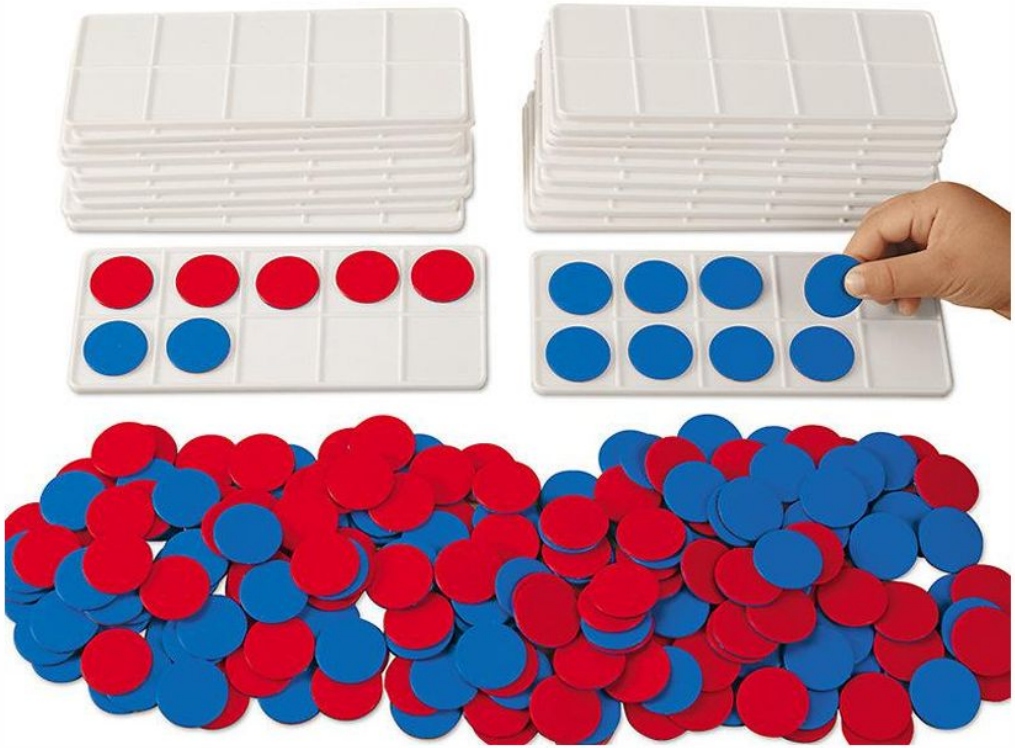
SOME OF THE CONCRETE RESOURCES THAT WE USE IN SCHOOL

TENS FRAMES AND DOUBLE SIDED COUNTERS



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SOME OF THE CONCRETE RESOURCES THAT WE USE IN SCHOOL

NUMICON

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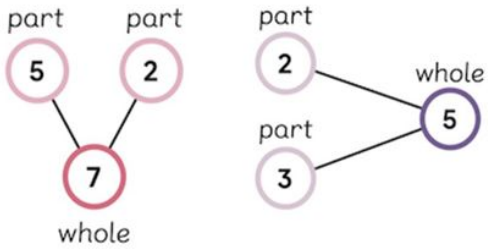
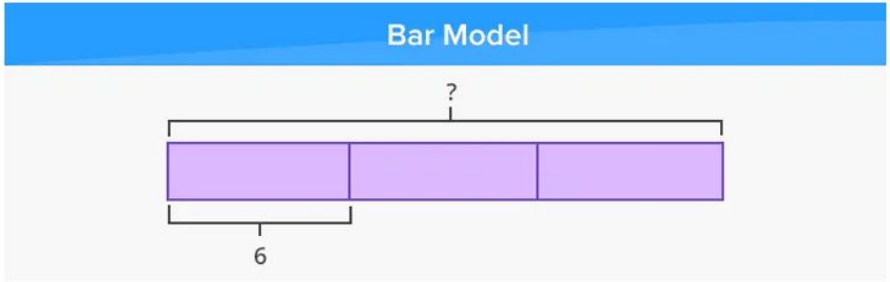
CPA – PICTORIAL STEP

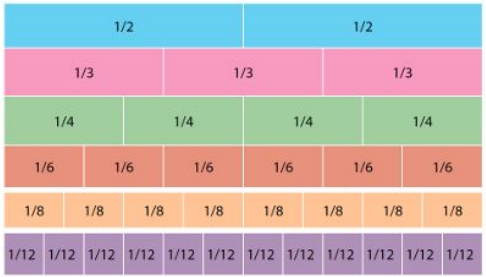
Pictorial is the 'seeing' stage. Here, visual representations of concrete objects are used to model problems. This stage encourages children to make a mental connection between the physical object they just handled and the abstract pictures, diagrams or models that represent the objects from the problem.

EXAMPLES OF MODELS AND DIAGRAMS

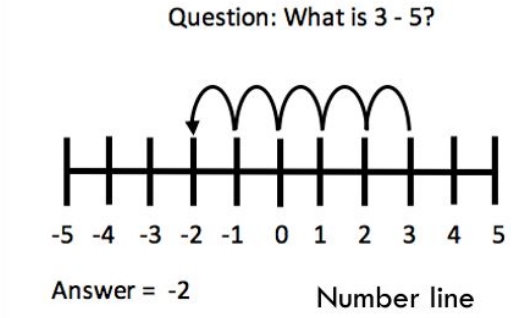


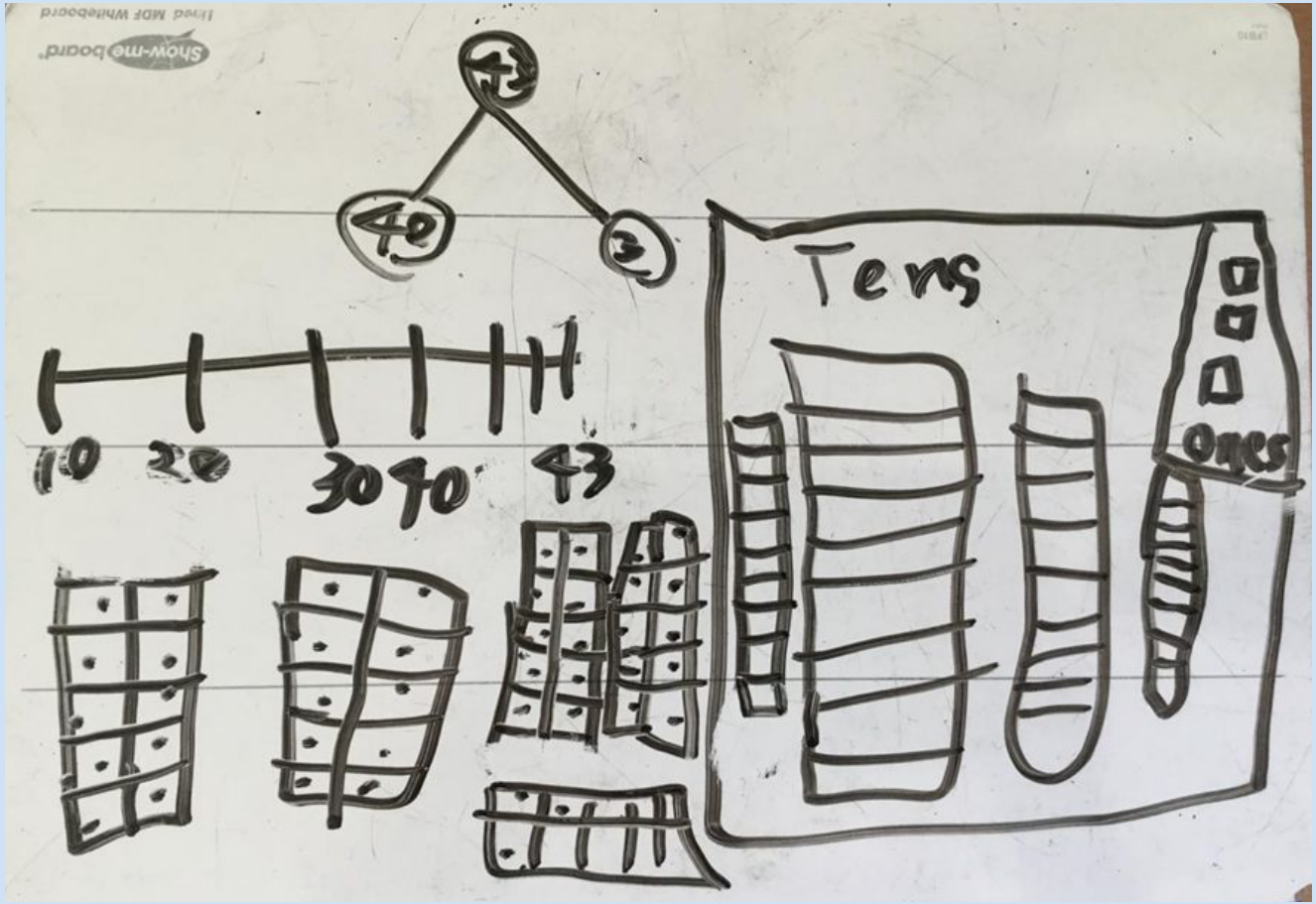
Part-whole model





Fraction wall




43
40
3
Tens
Ones
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43

CPA – ABSTRACT STEP

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Abstract is the 'symbolic' stage, where children use abstract symbols to model problems. They will not progress to this stage until they have demonstrated that they have a solid understanding of the concrete and pictorial stages of the problem.

The abstract stage involves the teacher introducing abstract concepts (e.g. mathematical symbols). Children are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols
(e.g. +, -, x, /) to indicate addition, subtraction, multiplication or division.

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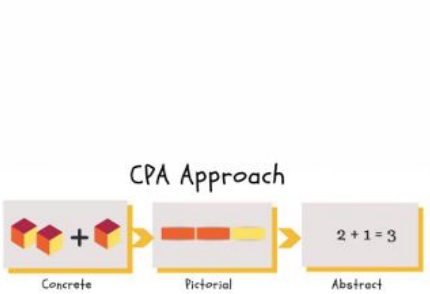
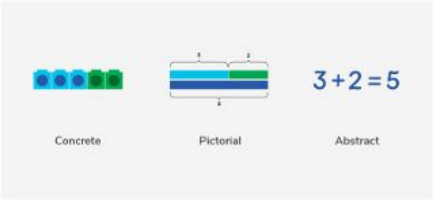
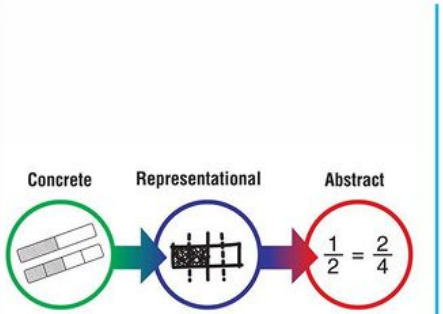
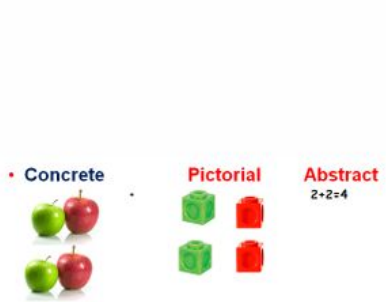


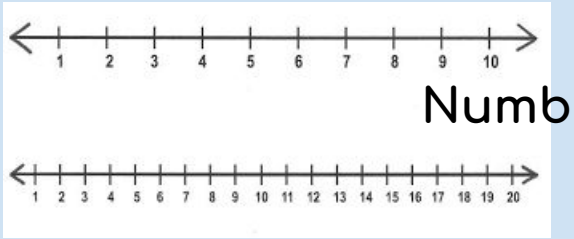






Teachers will move back and forth between these 3 stages to help reinforce concepts and embed understanding.

Place value counters



Number lines

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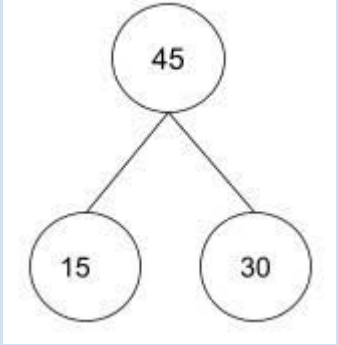
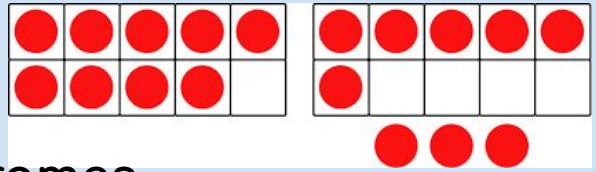
Part-whole model



Base 10

Numicon



Tens frames

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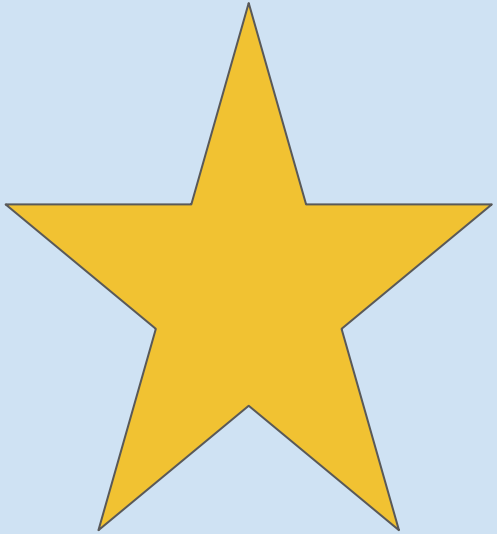
Let's have a play with some of the maths resources!



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Using the resources can you find different ways to make 27?

How parents and carers can support?

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You can support your child with this at home by:

- Encouraging children to use Doodle Maths
- Ensure that methods taught at home or by tutors are those taught in school
- Make maths enjoyable by doing everyday activities

Do you have any questions?

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