Maths at Highfield South Farnham

Tuesday 12th November 2024

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The Continual Pursuit of Excellence

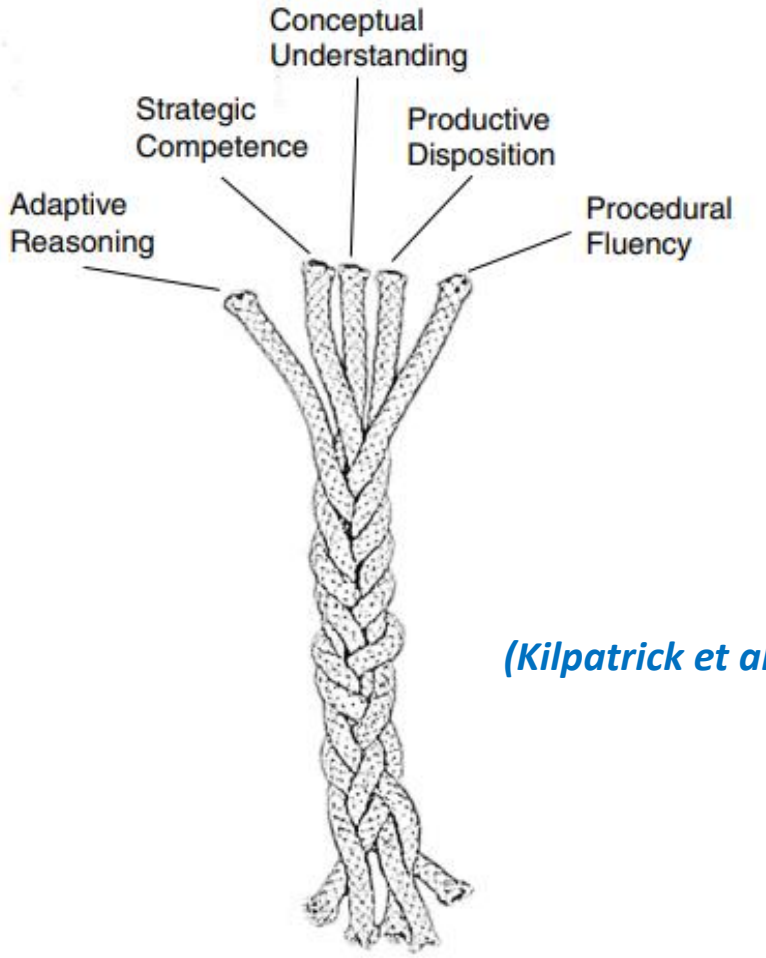
What will be covered in today's session?

- How maths is taught at Highfield
- The CPA approach to maths
- How to help your child at home

How would you describe a good mathematician?

A good mathematician should:

- Have a good understanding of the concept
- Have the tools to solve problems (fluency)
- Be able to use their tools to solve problems (problem solve)
- Explain and convince themselves and others that their thinking is correct (reasoning)
- Have a positive mindset



Intertwined Strands of Proficiency

(Kilpatrick et al 2001)

At Highfield we aim to…

Intent

- Motivated and enthusiastic children in maths
- An embedded conceptual understanding of the different areas of mathematics
- Produce confident children, who can reason, and problem solve

Implementation

- Differentiated approaches (CPA approach)
- Children practise little and often (e.g. number bonds, times tables, arithmetic, mental maths)
- Cross-curricular links for children to use mathematics in a range of contexts
- Assessment to help learners embed knowledge and inform teaching

Implementation

Why do we use the Busy Ants Scheme?

- Ensures coverage of the whole curriculum content
- Opportunities for children to practise the three aims of the curriculum: fluency, reasoning and problem solving
- Clear progression of skills within each unit
- Clear differentiated tasks with both additional support and extension tasks within each unit
- Ensures consistency between classes in each year group

What is the CPA approach to teaching maths?

Concrete, pictorial, abstract

- Based on research by psychologist Jerome Bruner
- Essential for developing a strong understanding of more difficult mathematical concepts
- A highly effective framework for progressing pupils to abstract concepts like fractions
- This is the approach all teachers at Highfield follow from Year R to Year Six

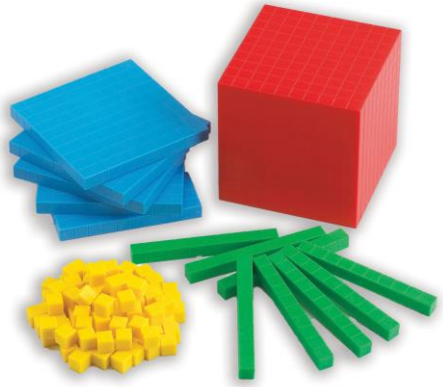
What is the CPA approach to teaching maths?

Concrete

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

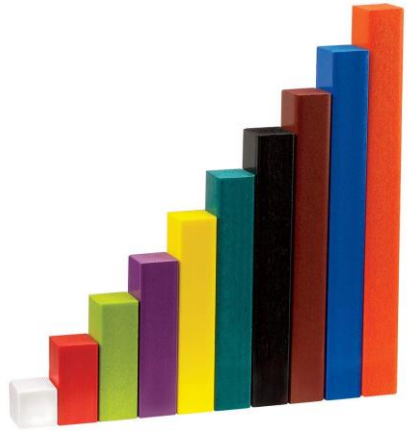
Numicon

Dienes



Bead strings

Multi-link cubes

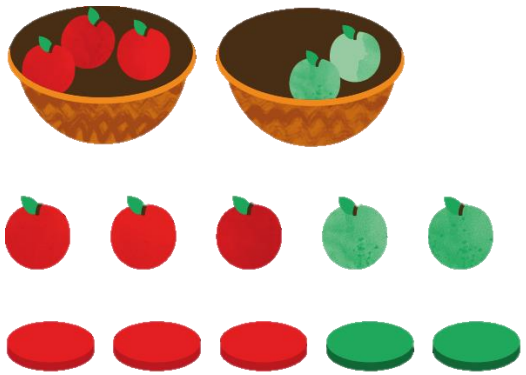


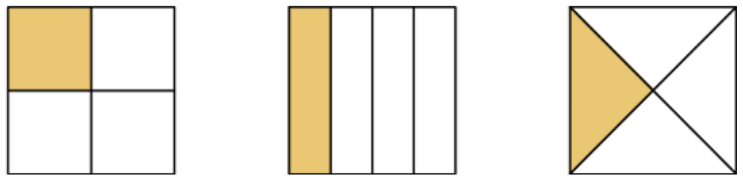
Cuisenaire rods

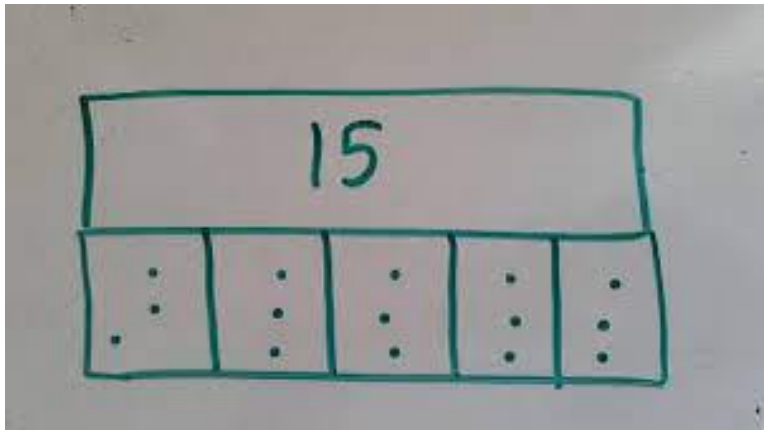
What is the CPA approach to teaching maths?

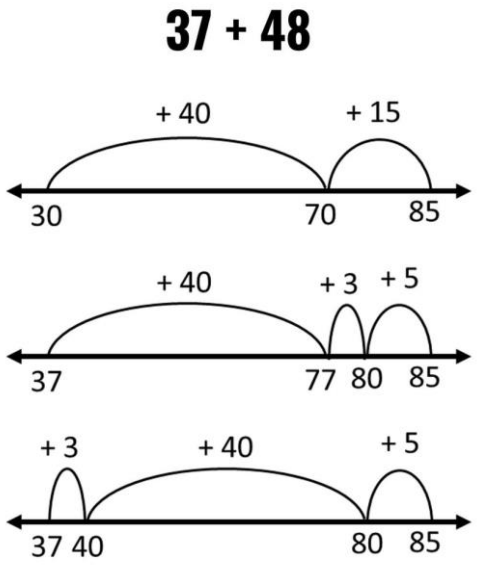
Pictorial

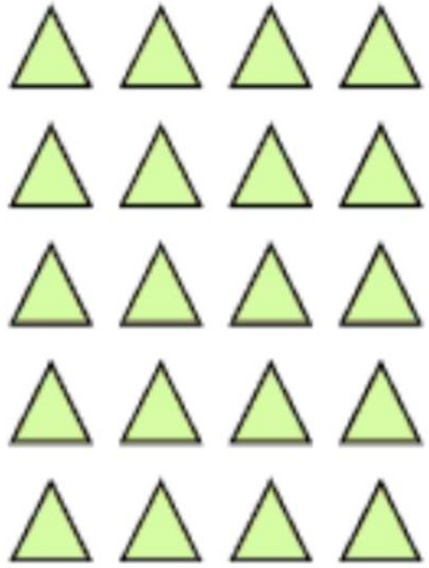
Pictorial is the “seeing” stage. During this stage, children use visual representations of concrete objects to model problems.











What is the CPA approach to teaching maths?

Abstract

Abstract is the “symbolic” stage. During this stage, children use abstract symbols to model problems.

32 + 16	61 + 21
75 + 12	22 + 67

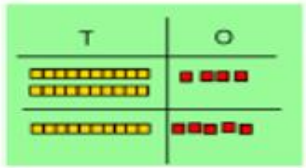
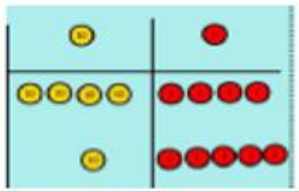
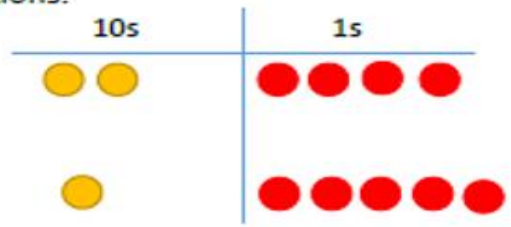
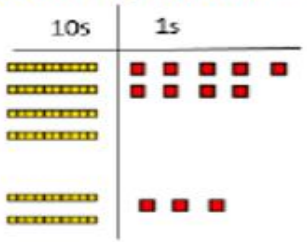
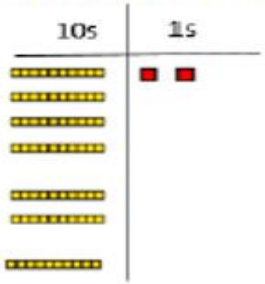
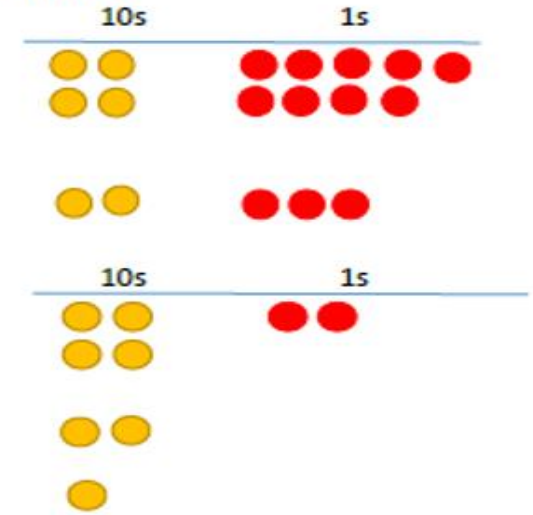
$$\frac{2}{3} \text{ of } 24 = 24 \div 3 \times 2$$

$$= 8 \times 2$$

$$= 16$$

1	2	2	6	4	
	-	1	2	0	(10 × 12)
		1	4	4	
	-	1	2	0	(10 × 12)
			2	4	
	-		2	4	(2 × 12)
				0	

What is the CPA approach to teaching maths?

	Objective	Concrete	Pictorial	Abstract
Year 2	Column method without regrouping	Add together the ones first, then add the tens. Use the Base 10 blocks first before moving onto place value counters. 24 + 15 =  44 + 15 = 	After physically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.  	24 + 15 = 39 24 + 15 39
	Column method with regrouping	Make both numbers on a place value grid.  Add up the units and exchange 10 ones for 1 ten.  	Using place value counters, children can draw the counters to help them to solve additions.  	40 + 9 20 + 3 60 + 12 = 72

What does this look like in the classroom?

Let's look at a few examples:

Addition

- **Children will learn both mental and formal methods for addition**

- **Children heavily rely on formal methods – even for the easiest of calculations**

What does this look like in the classroom?

Let's look at a few examples:

17 + 7

How many different ways could this be modelled?

- Cubes
- Bead strings
- Dienes
- Numicon

Which piece of equipment do you think is the best to use?

What does this look like in the classroom?

Let's look at a few examples:

17 + 7

How can we represent this question pictorially?

- **Bar models**
- **Number lines**
- **Dots**

What does this look like in the classroom?

Let's look at a few examples:

4 x 3

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What does this look like in the classroom?

Let's look at a few examples:

Fractions

- **Fractions are a notoriously difficult concept for children to grasp.**

- **Often, children who struggle have not had enough time to process the concrete and pictorial elements they need to correctly visualise and understand fractions.**

- **They may not have a concrete understanding of multiplication and division.**

What does this look like in the classroom?

Let's look at an example:

Tom and his three friends share 12 marbles equally. How many marbles does each child receive?

$$\frac{1}{4} \text{ of } 12$$

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How to build confidence in maths and help with homework

- Less is more – focus on quality thinking rather than quantity of questions.
- Ensure children have a solid concrete understanding of a concept.
- Do not rush them into the abstract form of maths too early.
- Ensure they can explain the concept using a variety of models – both concrete and pictorial.

Questions to ask…

- What are the steps to success?
- How did you perform this calculation at school?
- How else could you model or explain this?
- What are the common misconceptions?
- How did you solve a similar problem at home?
- How could you check?
- Which words/phrases tell you what operation to choose?
- What does … mean?
- How do you feel about your solution?
- Why do you feel confident about your solution?