INTRODUCTION: CONCRETE-PICTORIAL-ABSTRACT (CPA MODEL)





(CPA)

- At Hallfield, we follow the CPA model when planning and delivering lessons.
- "The **concrete-pictorial-abstract approach**, based on research by psychologist Jerome Bruner, suggests that there are **3 steps** (or representations) necessary for pupils to develop understanding of a concept. **Reinforcement is achieved by going back and forth between these representations**."
- Growth Mindset and belief that ALL pupils can achieve.
- Giving pupils opportunities for fluency, reasoning and problem-solving.

CONCRETE REPRESENTATIONS

- "Acting it out" with real objects.
- This is a **'hands on'** component using real objects and it is the foundation for conceptual understanding.



- Eg:

For division: separating apples into groups of red ones and green ones or by sharing 12 biscuits amongst 6 children.





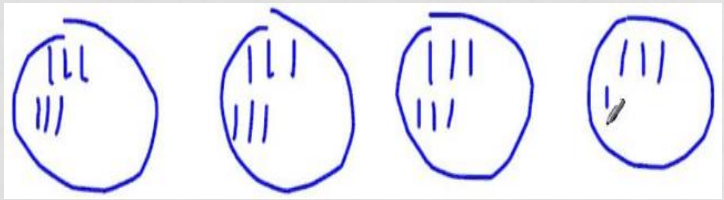
PICTORIAL REPRESENTATIONS

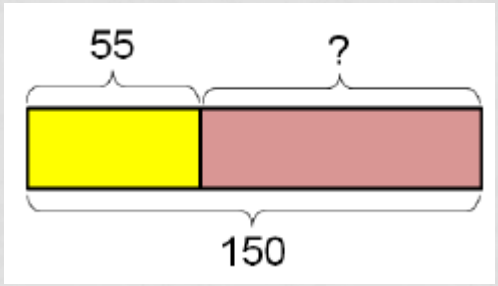
- A pupil has sufficiently understood the hands-on experiences performed and can now relate them to **representations**, such as a diagram or picture of the problem.



- E.g.:

This could be the action of circling objects.

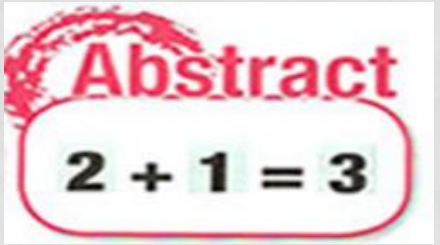




ABSTRACT REPRESENTATIONS

- The **symbolic stage** - a pupil is now capable of representing problems by using mathematical notation, for example: 12 ÷ 2 = 6





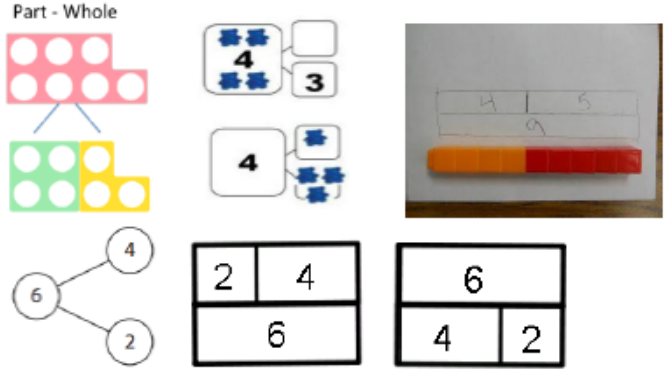
EXAMPLE OF OVERVIEW FOR THE YEAR

Year 1: At a Glance

	Autumn Term	Spring Term	Summer Term
Week 1	Number: Place Value	Measurement: Time	Number: Place Value
Week 2			
Week 3		Number: Place Value	
Week 4	Number: Addition and Subtraction		Number: Four Operations
Week 5		Number: Addition and Subtraction	
Week 6			
Week 7		Measurement: Length and height	Measurement: Money
Week 8	Number: Place Value	Number: Multiplication and Division	
Week 9			Measurement: Weight and Volume
Week 10	Number: Addition and Subtraction	Number: Fractions	
Week 11			
Week 12			
Week 13	Geometry: Shape		
Week 14			
Week 15			

Please note: The white boxes indicate term-time where it is not a full week. This could be at the beginning or end of a term but for the purposes of this document, they are at the end of the term.

OBJECTIVES

	Year 1 statements Key Performance Indicators (KPIs) underlined	Key mathematical vocabulary to be introduced in year 1	Nrich activities linked to curriculum statements	Possible misconceptions that may arise	Resources to be used
Term 1 (6 weeks and 3 days) White Rose Document Autumn Y1	Place Value (3 weeks) • Count to ten, forwards and backwards, beginning with 0 or 1, or from any given number. • Count in multiples of twos. • Count, read and write numbers to 10 in numerals and words. • Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least. • Given a number, identify one more or one less. Small steps (see new WR doc.): ✓ Sort objects ✓ Count objects ✓ Represent objects ✓ Count, read and write forwards from any number 0 to 10 ✓ Count, read and write backwards from any number 0 to 10 ✓ Count one more ✓ Count one less ✓ One to one correspondence to start to compare groups ✓ Compare groups using language such as equal, more/greater, less/fewer ✓ Introduce =, > and < symbols ✓ Compare numbers ✓ Order groups of objects ✓ Order numbers ✓ Ordinal numbers (1st, 2nd, 3rd ....) ✓ The number line	Numeral, forwards, backwards, equal to, equivalent to, most, least, many, multiple of,	Count, read and write numbers to 10 in numerals and words: What's in a Name? ** I Count the Digits *** I *(Possibly a Greater Depth challenge – tricky)* Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least: Dotty Six * G All Change * G I	Count to ten, forwards and backwards, beginning with 0 or 1, or from any given number: When counting objects, pupils can get confused by the mismatch between the number being said and the fact that only one object is being pointed to (1:1 correspondence). *Children can use beads to help them keep track of what they have counted.* Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than, most, least: When comparing numbers (e.g.: 12 and 4), pupils sometimes think they should add two digits e.g. 12 = 1+2 = 3 therefore 4 is larger than 12. *Reinforce and recap place value through the use of bundles straws to represent tens and ones (and place value cards):*	Numicon (concrete) Use numicons to reinforce numbers to 10 and number bonds to 10:  Children show understanding of numbers within 10 through part-whole and bar models, starting with numicon, counters and cubes before moving to pictorial and abstract models: Part - Whole  Make connections between different models and representations ("What's the same? What's different?")

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EXAMPLE OF LEARNING OBJECTIVES BROKEN DOWN FURTHER INTO SMALLER STEPS

Year 1 Autumn Term

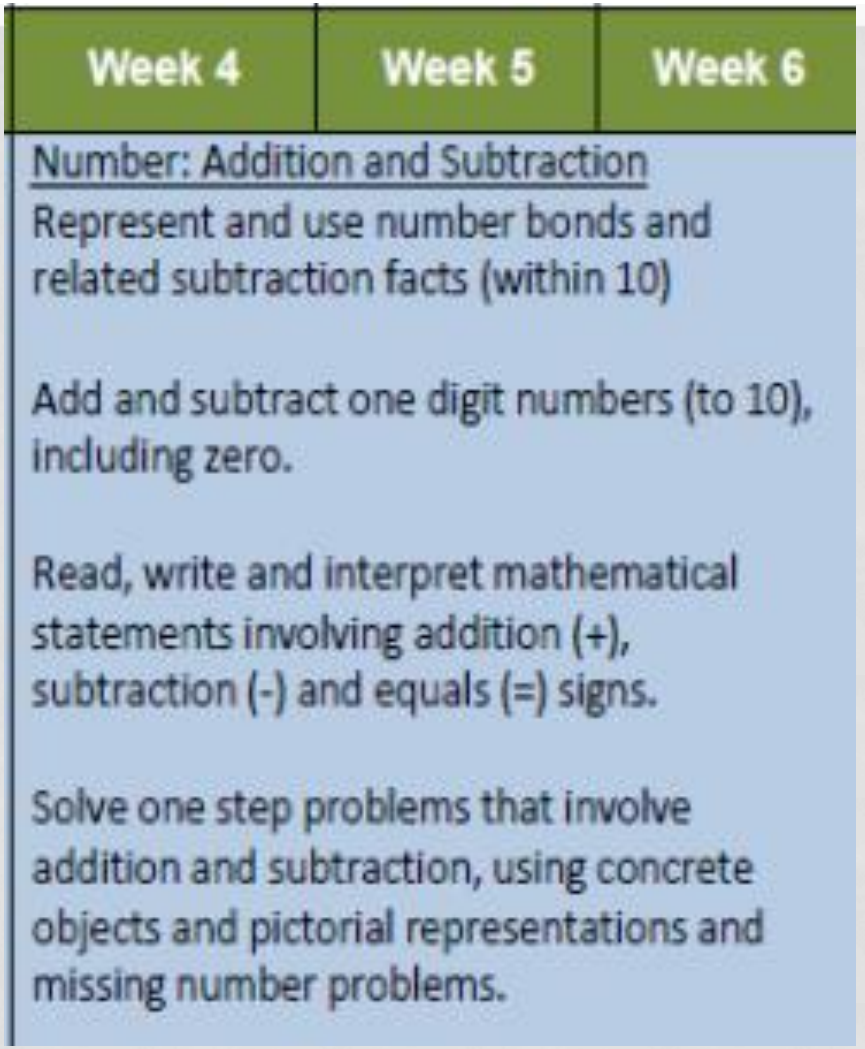
Topic	National Curriculum Learning Objectives	Lesson	Lesson Learning Objective
umber: Place Value (Numbers Within 10)	Count to 10, forwards and backwards, beginning with 0 or 1, or from any given number.	1	Count forward in order from 0 - 10.
		2	Count backwards in order from 10 - 0.
		3	Count groups of objects up to 10.
		4	To count forwards within 10 from any given number.
		5	To count backwards within 10 from any given number.
		6	To understand and investigate the meaning of zero.
	Count, read and write numbers to 10 in numerals and words.	7	To write numbers to 10.
	To identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least.	8	Compare numbers of objects (equal to, more than, less than (fewer), most, least)
	Given a number, identify 1 more or 1 less.	9	To identify 1 more than any number to 10.
		10	To identify 1 less than any number to 10.
		11	To order numbers within 10.
	Count in multiples of 2.	12	To count in multiples of 2 from 0.
		13	To count in multiples of 2 starting at any number within 10.
		14	Review
		15	Assess

MathsHUBS White Rose

FOCUS ON DEPTH OF UNDERSTANDING

- Year 1 example:

Adding and subtracting up to 10!



Week 4	Week 5	Week 6

Number: Addition and Subtraction

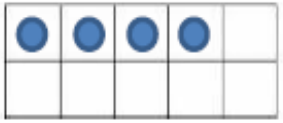
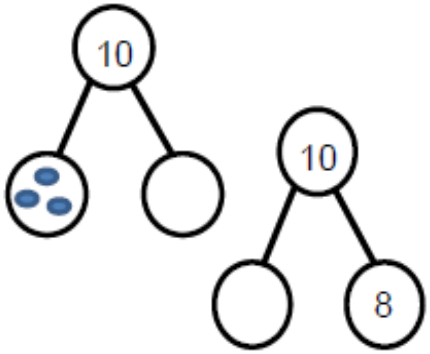
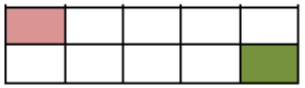
Represent and use number bonds and related subtraction facts (within 10)

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

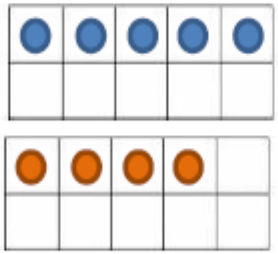
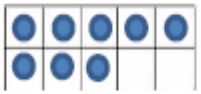
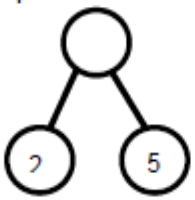
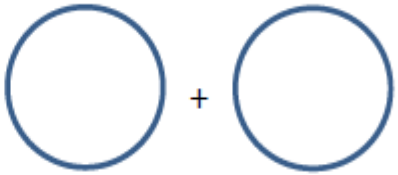
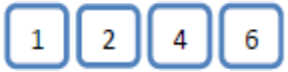
Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.

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

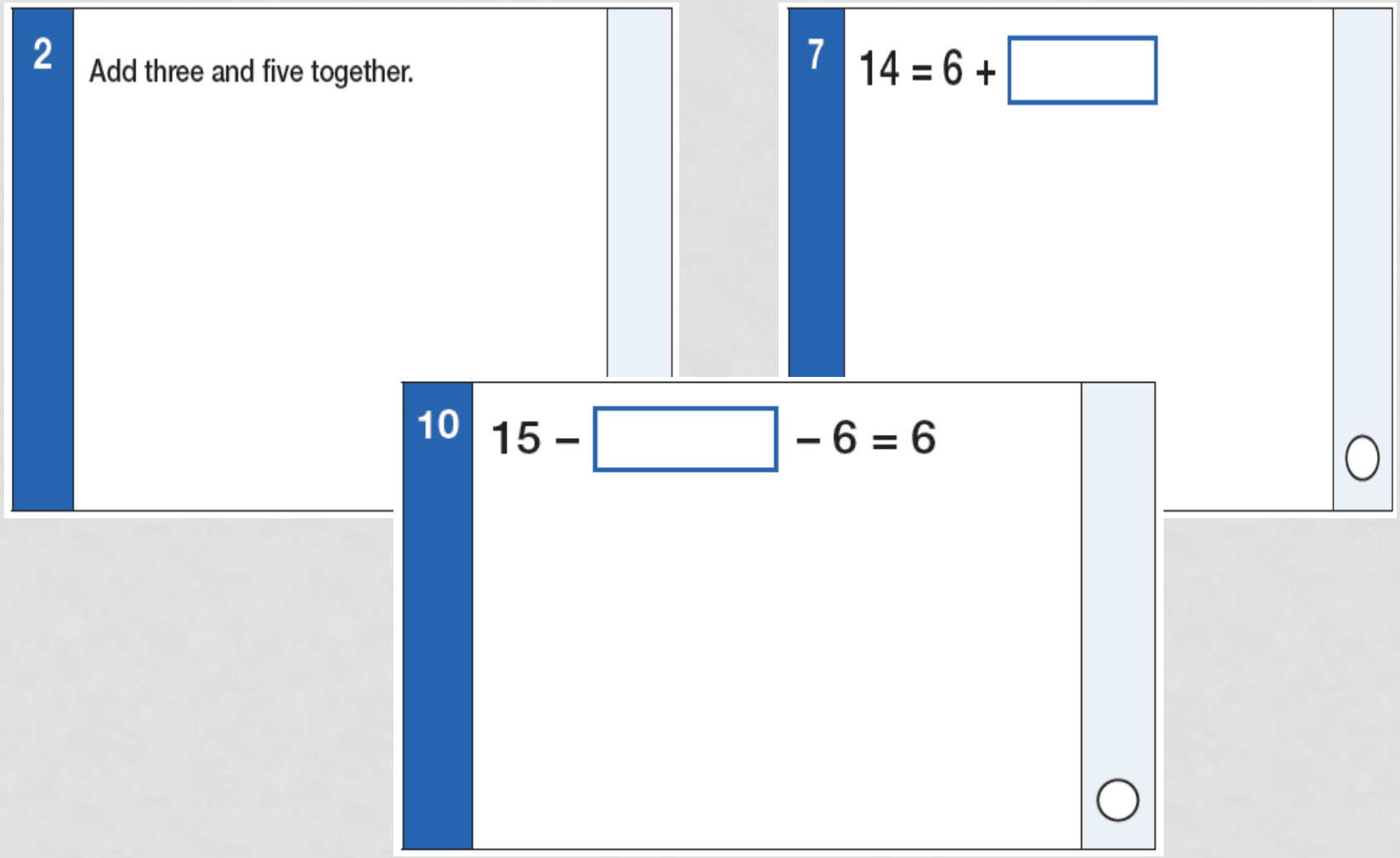
YEAR 1 ACTIVITY EXAMPLES

	National Curriculum Statement	All Students		
		Fluency	Reasoning	Problem Solving
Addition and Subtraction	Represent and use number bonds and related subtraction facts (within 10)	• Use a ten frame to complete the number bonds to 10.  5 + ☐ = 10  ☐ + 4 = 10  10 = 9 + ☐ • Complete the part whole model to find number bonds to 10. 	• Continue the pattern 0 + 8 = 8 1 + 7 = 8 _ + 6 = 8 3 + _ = _ _ + _ = _ Can you make a similar pattern for 10? • What number goes in the missing boxes? 9 + ☐ = 10 10 - ☐ = 9 Can you prove this using your fingers? • This stick of cubes shows 8 + 1 = 9  This stick of cubes shows 1 + 8 = 9  Use cubes to find if... 7 + 3 = 3 + 7	• I have 10p to spend. Which two items could I buy? How many different ways can you do it?  • All the dots have fallen off two toad stools. How many different ways can you put them back on?  • Beth needs to colour in the boxes in two different colours. One box of each colour has been coloured. How many different ways can she colour the boxes? 

YEAR 1 ACTIVITY EXAMPLES

	National Curriculum Statement	All Students		
		Fluency	Reasoning	Problem Solving
Addition and Subtraction	Add and subtract one digit numbers (to 10), including zero.	• Here are two ten frames.  Combine the numbers to find out how many there are altogether. Write a number sentence to show your working. • Solve the subtraction. 8 – 2 =  • Complete the part whole model. The two numbers at the bottom add up to make the number at the top. 	• Here are 8 cubes.  How many ways can you use the cubes to complete this number sentence?  Place the cubes in the two circles and write the addition sentence below.  How many pairs can you find? Are you sure there aren't any more? • Maryam says 'If you add 0 to a number, the number stays the same.' Do you agree? Explain why.	• Write the numbers 1 to 5 in the squares so that each row and column add up to same number.  • Pick a pair of numbers.  Add them together. How many different totals can you make? Choose a pair of numbers and takeaway one from the other. How many totals can you make now? • Sid has two bean bags. He is throwing them into the buckets.  More than one bean bag can go in each bucket. What is the highest/ lowest score?

ARITHMETIC (YEAR 1)



REASONING AND PROBLEM-SOLVING (YEAR 1)

3 Betty plants 2 flowers in each of these pots.



How many flowers does she have altogether?

flowers

4 Here is a number line from 0 to 10

