Southbourne Infant School
Calculation Policy 2020 - Concrete, Pictorial and Abstract
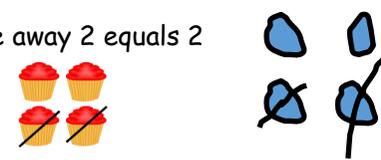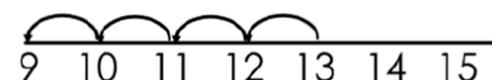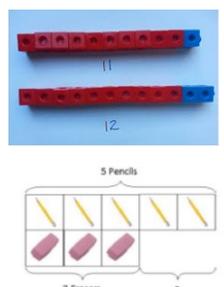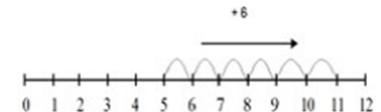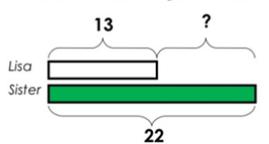
Concrete, Pictorial, Abstract (CPA) is a highly effective approach to teaching that develops a deep and sustainable understanding of maths in pupils.

- **Concrete** is the "doing stage, using concrete objects to model problems.

- **Pictorial** is the "seeing" stage, using representations of objects to model problems. This stage encourages children to make a mental connection between the physical object and abstract levels. This may include looking at pictures, drawing representations or diagrams.

- **Abstract** is the "symbolic" stage, where children are able to use abstract symbols to model problems. Children are introduced to mathematical symbols, for example +, -, x, ÷ to indicate addition, subtraction, multiplication and division.
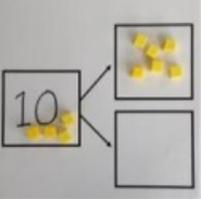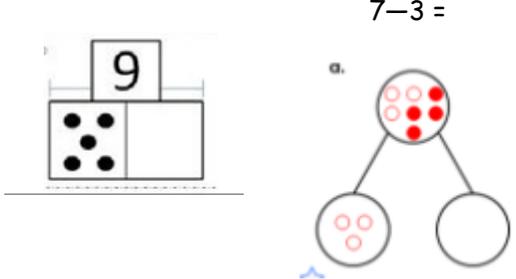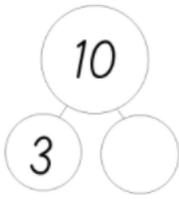
Calculation Policy—Subtraction

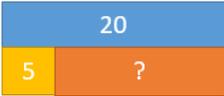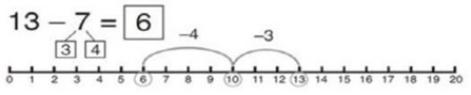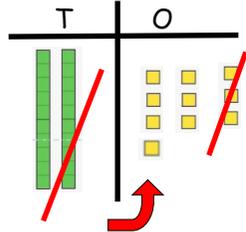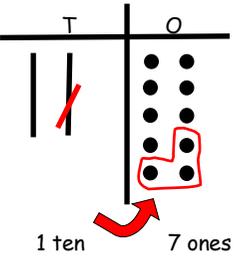|	Concrete	Pictorial	Abstract
Take away ones.	Use physical objects, counters, cubes etc to show how objects can be taken away. Four bears at the picnic. One goes home. How many are left?	Cross out pictures or drawn objects to take away. 4 take away 2 equals 2	10— 3 = 7 15—2 = 13
Counting back	Children jump back on a number line/lily pads.	Counting back on a number line in jumps of 1 9 10 11 12 13 14 15	24 =- 5 = 19 Put 24 in your head and count back 5. 24…..23, 22, 21, 20, 19.
Finding the difference	Compare objects and amounts 11 12 5 Pencils 3 Erasers Lay objects to represent bar model.	Count on using a number line to find the difference. +6 0 1 2 3 4 5 6 7 8 9 10 11 12 **Comparison Bar Models** Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them. 13 ? Lisa Sister 22	Hannah has 23 sandwiches, Helen has 15 sandwiches. Find the difference between the number of sandwiches. 23—15 = 8

Calculation Policy—Subtraction

	Concrete	Pictorial	Abstract
Use the inverse relationship to solve missing number problems. Part-Part Whole	If ten is the whole and 6 is one of the parts what is the other part?	7—3 =	I have 10 buns. I sell 3 at a cake sale. How many buns are left? 20 5 ?
Make 10	14-5=9 Make 14 on the ten frame or with different coloured cubes to represent the ten and the ones. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.	13 − 7 = 6 −4 −3 3 4 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 Jump back 3 first, then another 4. Use ten as the stopping point.	15 − 7= How many do we subtract to reach the next 10? How many do we have left to subtract? 15 −5 −2 =8
Regrouping a ten into ten ones	20 - 3 = Use dines to exchange a ten for ten ones and then take away 3. T O	20—3 = 17 T O 1 ten 7 ones	Children draw tens and ones grid and then draw sticks and dots to represent the tens and ones. 20—3 = 17

Calculation Policy—Subtraction

	Concrete	Pictorial	Abstract

Subtract two 2 digit numbers with no regrouping.	$34—13 = 21$
	
	Use Dienes to show how to partition the number when subtracting without regrouping.
		Children draw representations of Dienes and cross off.
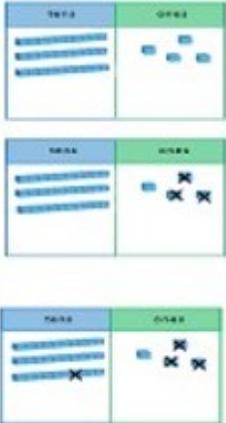		
		$34 – 13 = 21$
		
		2 tens 1 one
			$34 – 13 = 21$
			
			$30 – 10 = 20$
			
			$4 – 3 = 1$
			
			      3 4
			+ 1 3
			      2 1
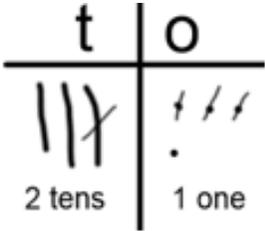
Subtract two 2 digit numbers with regrouping.	$54—36 = 18$
	
	T O
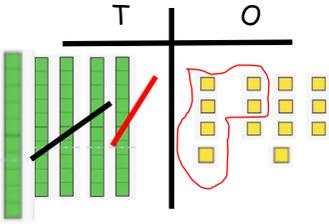	
	1 ten 8 ones
	
	Exchange a ten, take away 6 ones, then take away 3 tens.
		$54—36 = 18$
		
		T O
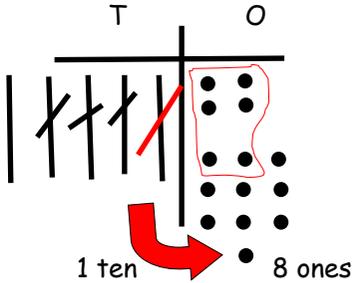		
		1 ten 8 ones
		
		Children draw 'sticks and dots' to represent 10s and ones.
		
		Cross off one ten and draw ten ones. Cross out 6 ones and then cross out 3 tens.
			$54—36 = 18$
			
			You cannot take 6 ones away from 4 ones so we need to borrow a ten.
			
			14 ones —6 ones = 8 ones
			
			4 tens—3 tens = 1 ten
			
			     $^4\cancel{5}$ $^1\!4$
			+ 3 6
			     1 8