Maths Parent Workshop -What we Teach, How we Teach it -Addition and Subtraction November 2022



Year 5 and Year 6



Concrete, Pictorial, Abstract

The children's understanding of the calculation strategies that they are taught through school will be underpinned by a secure understanding of place value. At Lindow Community we teach through a **CPA (concrete, pictorial, abstract) approach.**

Understanding in all areas of maths will be developed by children using concrete resources and interpreting and using pictorial representations before moving onto solve abstract calculations.

There are a range of place value and counting resources available for the children to use in each classroom. The CPA process/approach will be clearly exemplified on maths working walls for the current maths focus.







Useful Resources

Concrete resources are VITAL in the children's understanding of number and calculation.



addition								
Year 5								
National Curriculum Objectives: Addition objectives from Addition and Subtraction Strand	Key Skills/ other linked NC Objectives (Place Value)	Key Vocabulary						
 Add whole numbers with more than 4 digits, including using formal written methods (columnar addition). Add increasingly large numbers mentally. Solve addition multi-step problems in contexts, deciding which operations and methods to use and why. 	 Read, write and compare numbers to at least 1,000,000 and determine the value of each digit. Count forwards in steps of powers of ten for any given number up to 1,000,000. 	All previously taught vocabulary, plus Tenths, hundredths, thousandths, decimal places, decimal point						



add	IT	IO.	R
• • •			

Year 6

 National Curriculum Objectives: Addition objectives from Addition, subtraction, multiplication and division strand. Perform mental calculations, including with mixed operations and large numbers. Use their knowledge of the order of operations to carry out calculations involving the four operations. Solve addition multi-step problems in contexts, deciding which operations and methods to use and why. Solve problems involving fouroperations. Use estimation to check answers to calculations. 					
 Perform mental calculations, including with mixed operations and large numbers. Use their knowledge of the order of operations to carry out calculations involving the four operations. Solve addition multi-step problems in contexts, deciding which operations and methods to use and why. Solve problems involving fouroperations. Use estimation to check answers to calculations. 		National Curriculum Objectives: Addition objectives from Addition, subtraction, multiplication and division strand.		Key Skills/ other linked NC Objectives (Place Value)	Key Vocabulary
	•	Perform mental calculations, including with mixed operations and large numbers. Use their knowledge of the order of operations to carry out calculations involving the four operations. Solve addition multi-step problems in contexts, deciding which operations and methods to use and why. Solve problems involving four- operations. Use estimation to check answers to calculations.	•	Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit.	Consolidate use of all previously taught vocabulary.



Place Value

Tm Ten Millions 10 000 000	M Millions 1 000 000	Hth Hundred Thousands 100 000	Tth Ten Thousands 10 000	Th Thousands 1000	H Hundreds 100	T Tens 10	O Ones 1	t Tenths 0.1 $\frac{1}{10}$	h Hundredths 0.01 $\frac{1}{100}$	th Thousandths 0.001 $\frac{1}{1000}$



Community Primary School Roll your dice to find three digits. What are the biggest and smallest values you could make? What would the impact of zero be?



In school, the children have access to a wide range of practical resources and equipment, counting materials, models and images and are given the opportunity to use these to support their understanding of mental and written methods at all stages.

We spend time learning and practising mental methods for addition in a maths and arithmetic lessons to ensure the children gain a secure understanding.

In year 5, the children will explore number and different ways to partition number, to support addition strategies as well as adding the nearest multiple of 10, 100 and 1000 and adjusting (e.g. to add 9, 49, 99 999 etc.); using near doubles; partitioning and recombining; inverse and using number bonds.



Lindow Community Primary School



In year 6, the children also have access to a wide range of practical resources and equipment, counting materials, models and images and should be given the opportunity to use these to support their understanding of mental and written methods at all stages.

We spend time learning and practising mental methods for addition in our arithmetic sessions alongside our maths lessons to secure the children's fluency skills.



This will include exploring number and different ways to partition number, to support addition strategies as well as adding the nearest multiple of 10, 100 and 1000 and adjusting (e.g. to add 9, 49, 99 999 etc.); using near doubles; partitioning and recombining; inverse and using number bonds.



The Language of Addition



Lindow

Community Primary School

- Digit
- Digit sum
- Inverse
- Estimate
- Approximate
- Sum of
- Total
- Increase/decrease
- Integers
- Decimals

The Language of Addition

This sign shows the number of empty spaces on each level of a car park at 10am.



In this car park, each level has 800 spaces.

What is the total number of cars parked in the car park at 10am?





The Language of Addition

Match the calculations to the best estimates.

8,000,500 - 6,100,000

1,250,000 + 900,000

double 600,000

123,999 + 84,178





The Language of Addition – extracting what information is needed.

I am thinking of a number. I add 200,000, then subtract half a million, then add a quarter of a million. Then I round to the nearest 10, which is two million and fifty.





What number could Alex have been thinking of to start with?



Steps for Written Methods: YEAR 5

To include money, measures and decimals with different numbers of decimal places.

The decimal point should be aligned in the same way as their other place value columns and must be in the same column in the answer.







Steps for Written Methods: YEAR 6

Written method of column addition should be used in a variety of contexts and with numbers of increasing size and complexity.

This should include addition several numbers with different numbers of decimal places (including in the context of measures and money).

Tenths, hundredths and thousandths should be correctly aligned, with the decimal place lined up vertically, including in the answer row.

Zeros should be added into empty decimals places to show there is no value to add.





Lindow Community Primary School

Step 2: YEAR 5

The numbers that the children are adding together should exceed 4 digits.











	2	1	6	4	
+	3	2	1	3	

b) Th Н Т 0 4 2 7 5 100 (100 + 2 6 4 3 1,000 1,000 100 100 10 10 1,000 +100 (10) (1) (100

It is important that the children recognise that when exchanging (borrowing/stealing/t aking), they see it as exchanging 1 ten for 10 ones, 1 hundred for 10 tens etc. I will model how I show this to the children.



Step 2: YEAR 6

The children will be given opportunities to add several numbers with more than 4 digits.





Which calculations would you work out mentally, and which would you work out using the column method?



Work out the answers to the calculations.



Here is	a bar model.	
А	В	
	631,255	

- A is an odd integer that rounds to 100,000 to the nearest 10,000
- The sum of the digits of A is 30
- B is an even integer that rounds to 500,000 to the nearest 100,000
- The sum of the digits of B is 10
- A and B are both multiples of 5

What could be the values of A and B?

Explain your reasoning to a partner.

This table shows the heights of three mountains.

Mountain	Height in metres
Mount Everest	8,848
Mount Kilimanjaro	5,895
Ben Nevis	1,344

How much higher is Mount Everest than the combined height of the other two mountains?





Step 3: YEAR 5

Pupils should be able to add more than two values, carefully aligning place value columns. Children should understand the place value of tenths and hundredths and use this to align numbers with different numbers of decimal places. Empty decimal places should be filled with zero to show the place value of the column. Ensure correct vocabulary is used throughout. E.g. 6 tenths and 7 tenths equals 13 tenths.





Complete the additions.

3

Use the place value charts to help you.







Mental Methods: YEAR 5

The children should be taught to use the following mental strategies, and to use jottings to support their methods, where appropriate:

- Counting on in steps of 0.1, 1, 10, 100 or 1,000
- Reorder the numbers in a calculation
- Partitioning, adding the most significant digit first
- Compensating: Add a multiple of 10, 100 or 1,000 and adjust.
- Compensating: Double and adjust.
- Use knowledge of place value and related calculations e.g.6.3 + 4.8 using 63 + 48





Mental Methods: Year 6

The children will be taught to use the following mental strategies, and to use jottings to support their methods, where appropriate.

- Consolidate all strategies from previous years
- Partition, adding the most significant digit first
- Compensating: adding a whole number, multiple of 10 or double and adjust.
- Use knowledge of place value and related calculations e.g. 680 + 430, 6.8 + 4.3, 0.68 + 0.43 can all be worked outusing the related calculation 68 + 43.





Mental Methods – using it in the real world!

- Spending money in shops determining the total, estimating, calculating change
- Adding together ingredients when baking
- Countdown to events/dates numbers of days in weeks, days in months/years
- Counting opportunities
- Maths bingo







Lindow

Community Primary School



Т	2	3	4	5	6	7	8	9	10
=	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	38	29	30
31	32	33	34	35	36	37	48	39	40
41	42	43	44	45	46	47	58	49	50
51	52	53	54	55	56	57	68	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100





8.00 LL

AUS

In Educates

How can this stage be supported at home? Useful Websites

- <u>https://doodlelearning.com</u>
- <u>https://www.thenational.academy</u>
- <u>https://www.bbc.co.uk/bitesize</u>
- <u>https://www.cgpbooks.co.uk</u>
- <u>https://whiterosemaths.com/parent-resources</u>









subtraction

Year 5

N	ational Curriculum Objectives: Subtraction objectives from Addition and Subtraction Strand		Key Skills/ other linked NC Objectives (Place Value)	Key Vocabulary
•	Subtract whole numbers with more than 4 digits, including using formal written methods (columnar	•	Read, write and compare numbers to at least 1,000,000 and	All previously taught vocabulary, plus
	subtraction). Subtract increasingly large numbers		determine the value of each digit.	Tenths, hundredths,
	mentally.	•	Count backwards in	decimal, decimal point
•	Solve subtraction multi-step problems		steps of powers of ten	
	in contexts, deciding which operations		for any given number up	
	and methods to use and why.		to 1,000,000.	



Year 6

National Curriculum Objectives: Subtraction objectives from Addition, Subtraction, Multiplication and Division Strand	Key Skills/ other linked NC Objectives (Place Value)	Key Vocabulary
 Perform mental calculations, including with mixed operations and large numbers. Use their knowledge of the order of operations to carry out calculations involving the four operations. Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why. Solve problems involving four-operations. Use estimation to check answers to calculations. 	 Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit. 	Consolidate use of all previously taught vocabulary.



In year 5, the children continue to be given the opportunity to work with practical resources and pictorial representations in order to consolidate and extend their understanding of the maths which underpins the methods. They should be interpreting pictorial representations as part of their varied fluency, reasoning and problem solving.

The children will become, through regular practise, discussion and modelling, more independent in their ability to select the most efficient methods. They will be given regular opportunities to solve the same problem in several different ways and discuss their findings (this includes finding the difference).





In year 6, the children will be given the opportunity to apply their previous learning into new contexts and use it to solve problems in different ways.

Where children are not confident with previous learning or do not have a solid understanding of the place value and maths underpinning the strategies, they will have the opportunity to track back and fill these gaps in their learning. Children will be given the opportunity to regularly and independently select the most effective method from their repertoire. Children will also be given the opportunity to interpret and use mathematical pictures and practical resources as part of their varied fluency, reasoning and problem solving.





Steps for Written Methods: YEAR 5

To include money, measures and decimals with different numbers of decimal places.

The decimal point should be aligned in the same way as their other place value columns and must be in the same column in the answer.







Written Methods Step 1: YEAR 6

Using the compact column method to subtract more complex numbers.







Step 2: YEAR 5

Children will be taught to use the compact column method to subtract decimals, including mixtures of whole numbers and decimals, ensuring they align the decimal point correctly. Children should be taught to add a zero in any empty decimal places to aid understanding of what to subtract in that column.







Written Methods Step 2:

YEAR 6

Use the compact column method to subtract money and measures, including decimals with different numbers of decimal places. Children can fill empty decimal places with zeros to show the place value in each column.







Step 3: YEAR 5

Ensure children have experience of using this method for subtraction where there is a 0 in the column they need to exchange from, and that they understand, through clear modelling (using practical resources) how to move to the next column and exchange then 'move' the value along. Children to have lots of opportunities for subtracting and finding the differences with money and measures.





Written Methods YEAR 6

The children will be given the experience of using this method for subtraction where there is a 0 in the column they need to exchange from, and that they understand, through clear modelling

(using practical resources) how to move to the next column and exchange then 'move' the value along.





Mental Methods YEAR 5

- Counting back steps of 0.1, 1, 10, 100 or 1000
- Use known facts and place value to subtract
- Find a difference by counting on through the next multiple of 10, 100 or 1,000
- Subtract by counting up from the smaller to the larger number where this is the most efficient method
- Subtract the nearest multiple of 1, 10 or 100 then adjust
- Use knowledge of place value and related calculations e.g. 4.5 3.6 using 45 36
- Use the relationship between addition and subtraction



Lindow Community Primary School



Mental Methods YEAR 6

- Consolidate all mental strategies from previous year groups.
- Counting back in powers of tens, including tenths, hundredths and thousandths.
- Use knowledge of place value and related calculations
- Subtract a power of ten, or a whole number and adjust.
- Find the difference by counting up through the nearest multiple of 0,1, 10, 100 or 1,000
- then adjust.
- Continue to use the relationship between addition and subtraction.





Determining the most efficient method of working:

459,531 - 99,999 =





The Language of Subtraction



Lindow

Community Primary School Remaining

Left

- Decrease
- Combine
- Collect
- Spend
- Less
- Minus
- e Equivalent
- Missing value
- Difference

The Language of Subtraction





The Language of Subtraction

You can make green paint by mixing:

- 250 ml of blue paint
- 1,150 ml of yellow paint.

Stefan wants to make some of this green paint.

He uses 750 ml of blue paint.

How much green paint does he make?





End of Year Objectives – Year 5

Addition and Subtraction								
	Autumn	Spring	Summer					
Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)	\checkmark							
Add and subtract numbers mentally with increasingly large numbers	<							
Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	\checkmark							
Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	V							



End of Year Objectives – Year 6

Multiplication, Division, Addition and Subtraction (The Four Operations)				
	Autumn	Spring	Summer	
Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication	1			
Divide numbers up to 4 digits by a two-digit whole numb using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context	er 🗸			
Divide numbers up to 4 digits by a two-digit number usin the formal written method of short division where appropriate, interpreting remainders according to the context	ng ✓		Multiplication	
Perform mental calculations, including with mixed operations and large numbers	✓		multiplication	
Identify common factors, common multiples and prime numbers	√	Solve proble multiplication	ms involving add 1 and division	
Use their knowledge of the order of operations to carry of calculations involving the four operations	out 🗸	Use estimation determine, in degree of ac	on to check answ the context of a	
Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why				

Multiplication, Division, Addition and Subtraction (The Four Operations)				
	Autumn	Spring	Sun	
Solve problems involving addition, subtraction, nultiplication and division	V			
Use estimation to check answers to calculations and letermine, in the context of a problem, an appropriate legree of accuracy.	\checkmark			





Primary School



