

Unit 2

Addition and subtraction

Five daily lessons

National
Numeracy Strategy

Year 4
Autumn term

Unit Objectives

Year 4

- Consolidate understanding of the relationship between addition and subtraction.
- Understand the principles of the commutative law.
- Count on or back in repeated steps of 1, 10, 100 or 1000.
- Identify near doubles, using known doubles.
- Use informal pencil and paper methods to support, record or explain addition and subtraction.

Page 34

Page 34

Page 40

Page 40

Page 48

Link Objectives

Year 3

- **Know by heart all addition and subtraction facts for each number to 20.**
- **Add and subtract mentally a 'near multiple of 10' to or from a two-digit number.**
- Extend understanding of the operations of addition and subtraction.

Year 5

- **Extend written methods to column addition and subtraction of two integers less than 10 000.**
- **Calculate mentally a difference such as 8006 – 2993.**

This Unit Plan is designed to guide your teaching.

You will need to adapt it to meet the needs of your class.

Resources needed to teach this unit:

- Resource sheet/OHT 2.1
- Resource sheet/OHT 2.2
- Resource sheet/OHT 2.3
- Resource sheet/OHT 2.4
- Resource sheet 2.5
- Activity sheet 2.1
- Counting stick
- Number lines
- Computers
- Counter program
- NNS ICT pack
- Set of whiteboards
- Die marked +9, +9, -9, +11, -11

(Key objectives in bold)

Planning sheet	Day One	Unit 2 <i>Addition and subtraction</i>	Term: <i>Autumn</i>	Year Group: 4
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To recall complements of numbers to 20 and multiples of 10, 50 and 100.</p> <p>VOCABULARY complement</p> <p>RESOURCES Resource sheet/OHT 2.1 Counting stick</p>	<ul style="list-style-type: none"> Tell the children that you are going to call out a number and they have to say the complement to 20. Using Resource sheet/OHT 2.1, cover a number of spots; ask the children how many are covered. Use a counting stick, set the range to be 0 to 100. Each time you point to a division on the stick, ask one half of the class to call out the number (say 60) and the other half to call out its complement to 100 (40). Repeat as necessary, steadily increasing the pace. Repeat with multiples of 50 to 500 and for multiples of 100 to 1000 	<p>To continue to use the relationship between addition and subtraction.</p> <p>To understand that addition is the inverse of subtraction.</p> <p>To understand the principle (not the name) of the commutative law as applied to addition and subtraction.</p> <p>VOCABULARY inverse relationship</p> <p>RESOURCES Set of whiteboards OHP Computer(s) Counter program – NNS ICT pack</p>	<ul style="list-style-type: none"> Write on the board: <div>Q If I know that $25 + 35 = 60$, what else do I know?</div> <p>Discuss this with the class and record their responses on the board in the form:</p> <p>I know that $35 + 25 = 60$ $60 - 35 = 25$ $60 - 25 = 35$</p> Write on the board $156 + 127 = 283$. Ask children to write associated calculations on their whiteboards. Ask children to write a number sentence of their own and give to a partner to write the associated calculations. Emphasise that addition is the inverse of subtraction (and vice versa). Write a set of statements on the board where some are correct and some incorrect. Ask children to check these calculations by using the inverse operation. Demonstrate how you want this recorded: $50 - 33 = 17$; Correct because $33 + 17 = 50$ $48 + 28 = 70$; Incorrect because $70 - 28 = 42$ 	<ul style="list-style-type: none"> Introduce a function machine to the children that uses addition and subtraction. Use an OHP or board to display the function machine or the Counter program from the NNS ICT pack. <p>Enter the input number and the output number asking the children to give you the function.</p> <div>Q What clues help you to decide what the function could be?</div> <div>Q How do you know that your answer is correct?</div> <ul style="list-style-type: none"> Vary the game by changing the direction of the function and the missing numbers at either end e.g. <div> $24 \xrightarrow{+6} \square$ $24 \xleftarrow{+8} \square$ </div> <div> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Understand the commutative law of addition e.g. that $95 + 86 = 86 + 95$; Understand that addition is the inverse of subtraction, so that $90 - 35 = 55$ can be checked by $55 + 35 = 90$. <p>(Refer to supplement of examples, section 6, page 34.)</p> </div>

Planning sheet	Day Two	Unit 2 <i>Addition and subtraction</i>	Term: <i>Autumn</i>	Year Group: 4																		
Oral and Mental		Main Teaching		Plenary																		
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions																		
Consolidate understanding of relationship between addition and subtraction.	Write 80 – 24 = 56 on the board.	To count on or back in repeated steps of 1, 10 or 100. To add or subtract to the nearest multiple of 10 then adjust.	<ul style="list-style-type: none">Write on board 86 – 50. Invite children to offer strategies. Now demonstrate counting back to 50 in tens and counting forward in 10s and adjust as a strategy. Use empty number line to demonstrate the strategies. Ask children to do a further example and discuss. Repeat for 97 – 50. <div>Q What is happening to the digits which change/stay the same?</div> <ul style="list-style-type: none">Write two sets of numbers on board: Set A – two-digit numbers Set B – two-digit multiples of 10. <p>Children choose one number from each set and;</p> <p>a) add b) subtract them.</p> <p>They should work mentally with jottings.</p> <p>Check answers using the inverse operation.</p>	<ul style="list-style-type: none">Draw an incomplete 3 × 3 grid on an OHP or the board such as: <table><tr><td>164</td><td>30</td><td></td></tr><tr><td>20</td><td>418</td><td></td></tr><tr><td></td><td></td><td></td></tr></table> <p>Ask children to complete the grids using addition down and across the grid.</p> <p>Repeat with other grids which involve subtraction.</p> <table><tr><td></td><td>197</td><td></td></tr><tr><td>40</td><td></td><td></td></tr><tr><td>297</td><td>162</td><td></td></tr></table> <ul style="list-style-type: none">HOMEWORK – Give children incomplete addition and subtraction grids to complete (Activity sheet 2.1). <div>By the end of the lesson children should be able to:<ul style="list-style-type: none">Add or subtract by counting on/back in tens, then hundreds;(Refer to supplement of examples, section 6, page 40.)</div>	164	30		20	418						197		40			297	162	
	164				30																	
	20				418																	
					197																	
	40																					
	297				162																	
	<div>Q If we know this then what else do we know?</div>																					
	Write responses on the board.																					
	80 – 24 = 56																					
80 – 56 = 24																						
24 + 56 = 80																						
56 + 24 = 80																						
Ask the children to do the same with the three numbers 30, 16, 14. Work in pairs.																						

Planning sheet	Day Three	Unit 2 <i>Addition and subtraction</i>	Term: <i>Autumn</i>	Year Group: 4
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To count on or back in 10s and 100s from any two-digit number.</p> <p>VOCABULARY more than less than total</p> <p>RESOURCES Large hundred square Resource sheet/OHT 2.2 Computer(s) Counters program – NNS ICT pack</p>	<ul style="list-style-type: none"> Display a large hundred square. Ask the children to count forwards and backwards in 10s from a given starting number. Repeat from a new starting point. Ask the children for 100 more than 23, 100 more than 123 etc. Write the numbers on the board. Ask the children to count up from 23 in 100s to 923. Count back again. Get different children to choose the starting point for the class to count on and back. Use computer program 'Counter' to generate numbers as you count. Point out the tens digit, changing when counting in tens and the hundreds digit for counting in 100s. <p>Q What happens to the tens digit when we count up in tens?</p> <p>Q What happens to the hundreds digit when we count up in hundreds?</p> <p>Ask children to predict which number they will see next.</p>	<p>To add/subtract by counting on or back in repeated steps of 1, 10, 100.</p> <p>VOCABULARY multiple of count on (from to) count back (from, to)</p> <p>RESOURCES Resource sheet/OHT 2.3</p>	<ul style="list-style-type: none"> Write $85 + 50$ on the board. Get children to count on in 10s to reach the answer. Work through the example $285 + 50$ by counting on in 10s from 285 to 335. Model this on an empty number line. Go through several more examples of adding two-digit multiples of 10 to three-digit numbers. Get children to come out and demonstrate the method and their solutions. In a similar way use the empty number line to model $256 - 30$ by subtracting multiples of 10 and by counting on to the nearest multiples of 10 or 100. Go through several examples with the class. <p>Q Which digit is changing?</p> <ul style="list-style-type: none"> Move on to adding multiples of 100. Model $227 + 300$ by counting on in 100s. Go through several examples, and do the same for subtracting in multiples of 100. <p>Q Now which digit is changing?</p> <ul style="list-style-type: none"> Write Boxes A, B and C on the board. In Box A write ten three-digit numbers; in Box B write five two-digit multiples of 10; in Box C write five two-digit multiples of 100. In pairs, children choose a number from Box A and Box B and; <ul style="list-style-type: none"> a) add them b) subtract them. Then repeat, using numbers from Boxes A and C. Tell children how many calculations you expect them to do in the time available. Children should be working answers out mentally, using jottings if required. 	<ul style="list-style-type: none"> Display Resource sheet/OHT 2.3. Ask individuals, pairs or small groups to add or subtract multiples of 10 or 100 to or from the chosen number e.g. say; number chosen 56 – add 40; number chosen 174 – subtract 30. <p>Q Which digits are changing/ remaining the same?</p> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Count on/back in tens; Add/subtract by counting on or back in steps of 10 and 100. <p>(Refer to supplement of examples, section 6, page 40.)</p>

Planning sheet	Day Four	Unit 2 <i>Addition and subtraction</i>	Term: <i>Autumn</i>	Year Group: 4
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To double and halve any whole number from 1 to 50.</p> <p>VOCABULARY: double half halve estimate guess how many</p> <p>RESOURCES Resource sheet/OHT 2.4</p>	<ul style="list-style-type: none"> Display Resource sheet/OHT 2.4. Choose a number and ask the children to double it. Choose another number and ask the children to halve this number. Ask children to explain their strategies. <div>Q Which numbers up to 50 do you find hard to double? To halve? Why?</div> <p>List these difficult numbers on the board.</p> <div>Q Can you think of a strategy to help you halve and double these difficult numbers?</div> <ul style="list-style-type: none"> To double some numbers it might be helpful to keep jottings. Write on the board the strategies they are applying: $36 + 36$ double 30 and add 12. $39 + 39$ double 40 and subtract 2. Now ask the children to practise these strategies for 47, 38, 29, 19, 84, 97 and 78. Which strategies did they use for each number? 	<p>To identify near doubles, using known doubles.</p> <p>VOCABULARY double near double consecutive</p>	<ul style="list-style-type: none"> Write on the board; $27 + 27 = 54$. Ask children; <div>Q How might knowing this double help us work out the answers to these calculations?</div> $27 + 28 =$ $28 + 27 =$ $29 + 27 =$ $28 + 28 =$ $29 + 29 =$ Ask children to explain how they worked their answers out using their knowledge of $27 + 27 = 54$. Explain that these are 'near doubles'. Ask children to work in pairs and using Resource sheet/OHT 2.4 to select a number and write the double using informal jottings. Then ask each pair to devise 'near doubles' from the calculation. e.g. $19 + 19 = 38$ $19 + 20 = 39$ $18 + 19 = 37$ $18 + 20 = 38$ 	<ul style="list-style-type: none"> If I add two consecutive numbers, the answer is 35. What are the numbers? Discuss how to work this out. Now repeat with another number. Ask children for a rule which would work with any odd number, n. Record it for them as $(n-1) \div 2$ is the smaller number, and $\frac{(n-1)}{2} + 1$ is the other. <div> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Work out mentally near doubles, using appropriate strategies; $38 + 36$; $37 + 35$; $49 + 50$. <p>(Refer to supplement of examples, section 6, page 40.)</p> </div>

Planning sheet	Day Five	Unit 2 <i>Addition and subtraction</i>	Term: <i>Autumn</i>	Year Group: 4
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities / Focus Questions
<p>To add or subtract a near multiple of 10 and adjust.</p> <p>VOCABULARY multiple near multiple significant</p> <p>RESOURCES Resource sheet/OHT 2.2 Resource sheet 2.5 Class set of answer boards and counters Pack of cards numbered 12 to 27 Pack of cards numbered 9 and 11 Die numbered +9, +9, -9, +11, +11, -11</p>	<ul style="list-style-type: none"> Ask the class if they can suggest a strategy for adding then subtracting 9 and 11. Ensure that these are well understood. Model on 100 square Resource sheet/OHT 2.2; call out numbers for the children to subtract 9 and 11 from. Build up speed and mix the four calculations as the children become more confident. Give children a blank 3×3 grid – they fill in by choosing numbers from 1 to 38. Two children come out to the front – one chooses from the 12-27 cards (Resource sheet 2.5), and the other shakes a die marked +9, +9, -9, +11, +11, -11. Children put a counter on correct answers; first child to have three in a row wins, but must repeat the number sentence for the last calculation. 	<p>To develop informal written methods to support, record or explain additions.</p> <p>VOCABULARY increase significant vertical partition</p>	<ul style="list-style-type: none"> Write $53 + 24$ on the board. Demonstrate how to perform this calculation by adding the most significant digit first. Ask the class to partition the numbers. <div>Q Which are the most significant digits?</div> $\begin{array}{r} 53 + 24 \\ = 70 + 7 \\ = 77 \end{array}$ <ul style="list-style-type: none"> Work through other examples with the class and demonstrate an example crossing the tens boundary; $\begin{array}{r} 38 + 43 \\ = 70 + 11 \\ = 81 \end{array}$ <ul style="list-style-type: none"> Give the children examples they are to do in their books. Explain that they should look for the most significant digits first, so $30 + 40$. Collect and review their answers and correct any misinterpretations. Show an example of HTU + TU not crossing either the tens or the hundreds boundary using an extended form of vertical addition; $\begin{array}{r} 126 + 61 \\ = 100 + 20 + 6 \\ + \quad 60 + 1 \\ 100 + 80 + 7 = 187 \end{array}$ <p>Work through more examples. Set the class an exercise to do in pairs, recording vertically with partitioning.</p>	<ul style="list-style-type: none"> Collect and review children's answers, correct any misinterpretations. <p>Ask children to demonstrate examples on the board.</p> <ul style="list-style-type: none"> Write on the board in vertical layout an example they have already seen. $\begin{array}{r} 126 \\ + 61 \\ \hline 100 \\ 80 \\ \hline 7 \\ 187 \end{array}$ <p>Ask the children to explain the layout and to lead you through the same layout for $234 + 45$.</p> <div> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> Use informal written methods to add two two-digit numbers or a mix of two- and three-digit numbers. <p>(Refer to supplement of examples, section 6, page 48.)</p> </div>

Notes

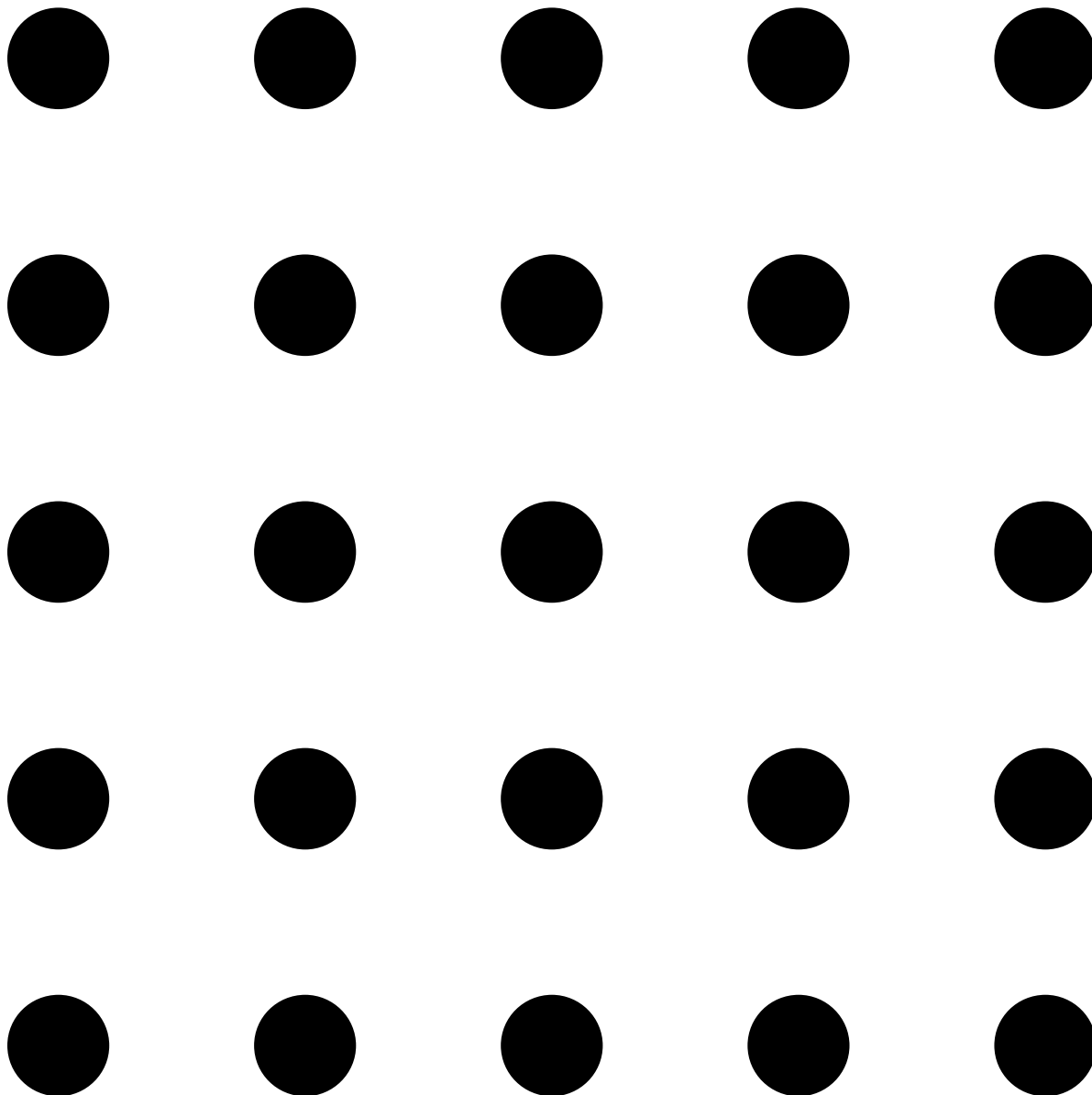
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Twenty Spots



Hundred Square for OHT

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	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

56	87	234	74
253	174	35	412
68	116	359	51

24	30	33	45
36	16	42	28
48	39	19	50

Game cards

12	13	14	15
16	17	18	19
20	21	22	23
24	25	26	27

