

Unit 10 Addition and subtraction 2

Five Daily Lessons

National
Numeracy Strategy

Year 5
Spring term

This Unit Plan is designed to guide your teaching. You will need to adapt it to meet the needs of your class.

Unit Objectives Year 5

- **Extend written methods to: column addition/subtraction of two integers less than 10 000;** addition of more than two integers less than 10 000; addition or subtraction of a pair of decimal fractions one or both with two decimal places (e.g. £29.78 + £53.34).
- **Use all four operations to solve simple word problems involving numbers and quantities.**

Pages 49, 51

Pages 82 to 89

Resources needed to teach this unit:

- Resource sheet 10.1
- Resource sheet 10.2
- OHT 10.1
- Whiteboards
- Counting stick
- Number fans

Link Objectives

Year 4

Year 6

- **Develop and refine written methods for: column addition and subtraction of two whole numbers less than 1000, and addition of more than two such numbers.**
- Use all four operations to solve word problems involving numbers in 'real life', money and measures (including time), using one or more steps.

- **Extend written methods to column addition and subtraction of numbers involving decimals.**
- **Identify and use appropriate operations (including combinations of operations) to solve word problems involving numbers and quantities.**
- **Explain methods and reasoning.**

(Key objectives in bold)

Planning sheet	Day One	Unit 10 <i>Addition and subtraction 2</i>	Term: <i>Spring</i>	Year Group: 5									
Oral and Mental		Main Teaching		Plenary									
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions									
<p>Derive quickly two-digit pairs that total 100.</p> <p>Add several two-digit numbers.</p> <p>VOCABULARY total complement sum of</p> <p>RESOURCES Whiteboards OHT 10.1</p>	<ul style="list-style-type: none"> Tell the children that they are going to practise complements to 100 by playing complement tennis. You will 'serve' a number less than 100 and they have to return the complement e.g. teacher serves 60, child returns 40. Start with multiples of 10 then multiples of 5, then any two-digit number. Gradually build up speed. Display OHT 10.1. <table border="1" data-bbox="309 783 577 863"> <tr><td>52</td><td>74</td><td>48</td></tr> <tr><td>37</td><td>56</td><td>81</td></tr> <tr><td>19</td><td>26</td><td>63</td></tr> </table> <p>Ask questions such as:</p> <p>Q What number is closest to 100?</p> <p>Q Can you find a pair of numbers which total 100?</p> <p>Q What is the sum of the top row, the corners, the right-hand column?</p> <p>Children show answers using whiteboards. Discuss solutions and methods.</p>	52	74	48	37	56	81	19	26	63	<p>Extend written methods to column addition of two integers less than 10 000.</p> <p>VOCABULARY four-digit number most significant least significant</p> <p>RESOURCES Whiteboards</p>	<ul style="list-style-type: none"> Display the following problem on the board or OHP: 3587 people purchased advance tickets for the final home game of the season at Boston United. A further 675 people bought tickets on the gate. How many people attended the game altogether? <p>Q What calculation do we need to do to work out the answer to this problem?</p> <p>Establish that the calculation is addition.</p> <ul style="list-style-type: none"> Remind the children of the column method they used for the addition of 2 three-digit numbers. Tell them that they will use the same method for solving this problem which involves the addition of a three-digit and four-digit number. Demonstrate how to set the addition out vertically, by adding the most significant digit first. Ask the children to do this with you on their whiteboards. $\begin{array}{r} 3587 \\ + 675 \\ \hline 3000 \\ 1100 \\ 150 \\ 12 \\ \hline 4262 \end{array}$ <p>At each stage ask:</p> <p>Q How many thousands will there be?</p> <p>Q How many hundreds will there be?</p> <p>Q How many tens will there be?</p> <p>Q How many units will there be?</p> <p>Q What is the total?</p> <p>Remind children that this method starts from the most significant digit i.e. the thousands.</p> <p>Establish that thousands, hundreds, tens and units must line up underneath one another in the correct columns.</p> <ul style="list-style-type: none"> Now give the children addition questions to do using this method. Include questions which require the addition of more than two numbers. Work through a further example e.g. 5709 + 3296 prompted by the children at each stage. 	<ul style="list-style-type: none"> Collect children's answers and correct any errors and misconceptions. Select one of the questions and work through the addition with the class, this time working from the least significant digit e.g. $\begin{array}{r} 4736 \\ + 582 \\ \hline 8 \\ 110 \\ 1200 \\ 4000 \\ \hline 5318 \end{array}$ <p>Emphasise the similarity between this method and the earlier method but this time the addition starts from the least significant digit i.e. the units.</p> <ul style="list-style-type: none"> Give children the addition 6285 + 445 to do. Say they can use either method to answer it. Collect answers and discuss the approach they chose and why. <div data-bbox="1778 959 2168 1332" style="border: 1px solid black; padding: 5px;"> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Use a written column method to add a four-digit to a three-digit number by adding the most significant digit first or the least significant digit first; Discuss, explain and compare methods. <p>(Refer to supplement of examples, section 6, page 49.)</p> </div>
52	74	48											
37	56	81											
19	26	63											

Planning sheet		Day Two		Unit 10 <i>Addition and subtraction 2</i>	Term: <i>Spring</i>	Year Group: 5
Oral and Mental		Main Teaching			Plenary	
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities			Teaching Activities/Focus Questions
<p>Count on and back in equal steps.</p> <p>Use known number facts and place value for mental addition.</p>	<ul style="list-style-type: none"> Use the counting stick. Tell the children that they are going to count up and down in steps of 0.1 starting at different points. Count from 0 to 1 and back. Change the starting point e.g. 1.4 and count on and back in steps of 0.1. Ensure children cross the whole number boundary correctly. Repeat from other starting points. Extend to counting in steps of 0.2 and 0.5. Write the following decimal numbers on the board: 1.2, 0.6, 2.7, 3.3, 0.8, 0.2, 4.4, 3.8, 6.1 <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q Can you find a pair of numbers which add up to 1, 2, 4, 5, 6?</p> </div> <p>Children to show their answers on whiteboards. Correct any errors and misunderstandings.</p> <ul style="list-style-type: none"> Extend to sets of three or four numbers to make whole number totals. 	<p>Use column written methods to add two or more decimal numbers.</p> <p>VOCABULARY ten unit tenth hundredth decimal place</p> <p>RESOURCES Whiteboards</p>	<ul style="list-style-type: none"> Display the following problem on the board: Last week I spent £48.76 at the supermarket. This week I spent £37.53. How much did I spend altogether? <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q What calculation do we need to carry out?</p> </div> <p>Establish that the calculation is addition.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q How could we work this out?</p> </div> <p>Discuss strategies.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q What would you estimate the answer to be?</p> </div> <p>Discuss children's estimates and methods and establish that the answer will be about £90.</p> <ul style="list-style-type: none"> Tell the children that we can use a similar written method of addition to that used in the previous lesson. <p>Demonstrate how to add the two amounts by adding the most significant digit first. Emphasise the need to line up the decimal points.</p> $ \begin{array}{r} 48.76 \\ + 37.53 \\ \hline 70.00 \\ 15.00 \\ 1.20 \\ 0.09 \\ \hline 86.29 \end{array} $ <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q Does the answer seem reasonable?</p> </div> <p>Refer back to estimation of £90 and agree the answer is reasonable.</p> <ul style="list-style-type: none"> Work through other questions involving measures e.g. 14.78 m + 26.24 m. Use the least significant digit first and ask children to prompt you at each stage. Give the children addition problems, including money, measures and time. Remind them to estimate before they calculate. <p>Tell them to work out the answers using the least significant digit method.</p> <ul style="list-style-type: none"> Collect answers and correct any mistakes or misunderstandings. 			<ul style="list-style-type: none"> Write the following information on the board: The rides are priced as follows: White Knuckle £1.65 Dodgems £0.90 Wall of Death £2.30 Space Wheel £1.25 <p>Ask the children to work out answers to questions such as:</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q How much is it to go on each ride once?</p> </div> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q If I have £4.00 to spend, which rides could I go on?</p> </div> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q How much does it cost to go on the Space Wheel three times and the White Knuckle twice?</p> </div> <p>Children are to show their answers on their whiteboards.</p> <p>Tell the children they may use mental methods, jottings, or the column written methods they have been using.</p> <ul style="list-style-type: none"> Discuss strategies and answers. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Use a written column method to add two or more decimal numbers; Know that decimal points should line up under each other; Solve mathematical problems involving money and measures. <p>(Refer to supplement of examples, section 6, pages 49, 82 to 89.)</p> </div>
VOCABULARY decimal units boundary						
RESOURCES Counting stick Whiteboards						

Planning sheet		Day Three		Unit 10 <i>Addition and subtraction 2</i>		Term: <i>Spring</i>		Year Group: 5	
Oral and Mental			Main Teaching				Plenary		
Objectives and Vocabulary		Teaching Activities		Objectives and Vocabulary		Teaching Activities		Teaching Activities/Focus Questions	
Rapid recall of multiplication facts.		<ul style="list-style-type: none"> With class recite 6, 8 and 9 times tables. Repeat each table twice. Ask a series of questions related to these multiplication tables for children to answer using number fans. 		Subtract whole numbers with up to four digits using a written column method.		<ul style="list-style-type: none"> Write the following problem on the board: 3450 people attend a football match. At half-time 867 people leave. How many people stay to the end of the match? 		<ul style="list-style-type: none"> Collect children's answers and correct any errors or misunderstandings. Remind them of the importance of making an estimate to see whether the answer appears to be sensible or whether they think they might have made an error. On the board write: $3450 - 867 = 2583$ 	
<p>Q What is 3×6, 8×4, 7×9?</p>		<p>Identify any common mistakes or difficulties and note these on the board.</p>		<p>Q What calculation must we carry out to work out the answer?</p>		<p>Establish that this is a subtraction problem.</p>		<p>Q What is the answer to $2583 + 867$? Why?</p>	
<ul style="list-style-type: none"> Return to any number facts noted on the board and recite sections of multiplication tables that contain these facts. Hide the facts and ask children to recite them aloud. To those already on the board add other incomplete facts such as 7×8, 5×6, 8×9, for children to answer using their number fans. Note the answers on the board. Refer to the facts on the board and ask questions based on these such as: 		<p>Remind the children of the method of subtraction they have been taught earlier. Demonstrate the complementary addition method to work out the answer to the above problem.</p>		<p>Discuss suggestions and agree on an estimate, in this case 2500.</p>		<p>Q How could we estimate the answer?</p>		<p>Establish the relationship between addition and subtraction to justify that the answer is 3450. Encourage children to use smaller numbers as examples e.g. $30 - 10 = 20$ and $20 + 10 = 30$.</p>	
<p>Q What is 70×8, 0.5×6, 800×9?</p>		<p>Collect answers orally and discuss how children used the number facts on the board to answer these questions.</p>		<p>Remind the children that the jumps are to and from hundreds and thousands numbers as this helps make the addition easier. Explain that this can be set out using a column method. Work through the method and relate it to the jumps on the number line.</p>				<p>Select one of the subtraction questions and ask children to check the answer is correct using an appropriate addition.</p>	
<p>VOCABULARY multiple factor</p>		<p>VOCABULARY subtract take away minus</p>		$\begin{array}{r} 3450 \\ - 867 \\ \hline 33 \quad \text{to make 900} \\ 100 \quad \text{to make 1000} \\ 2000 \quad \text{to make 3000} \\ 450 \quad \text{to make 3450} \\ \hline 2583 \quad \text{Answer is 2583.} \end{array}$		<p>Compare the answer with the estimate.</p>		<p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Subtract pairs of numbers involving a different number of digits by counting up; Find an estimate and check answers; Use the relationship between addition and subtraction to check answers. 	
<p>RESOURCES Number fans</p>				<ul style="list-style-type: none"> Write on the board: $2340 - 758$. Agree an estimate then work through the calculation. At each stage ask children for prompts. 				<p>Check the children's addition is correct and confirm the subtraction.</p>	
				$\begin{array}{r} 2340 \\ - 758 \\ \hline 42 \quad \text{to make 800} \\ 200 \quad \text{to make 1000} \\ 1340 \quad \text{to make 2340} \\ \hline 1582 \quad \text{Answer is 1582} \end{array}$		<p>Compare the answer with the estimate.</p>		<p>(Refer to supplement of examples, section 6, pages 51 and 73.)</p>	
				<ul style="list-style-type: none"> Give the children subtractions, such as: $832 - 645$; $2733 - 1609$; $9876 - 543$; $573 - 67$. Tell children that they are to work in pairs. For each calculation they must first agree an estimate with their partner. 					

Planning sheet		Day Four (page 1 of 2)		Unit 10 Addition and subtraction 2		Term: Spring		Year Group: 5	
Oral and Mental			Main Teaching				Plenary		
Objectives and Vocabulary	Teaching Activities		Objectives and Vocabulary	Teaching Activities			Teaching Activities/Focus Questions		
<p>Round numbers with one decimal place to the nearest whole number.</p> <p>VOCABULARY round whole number decimal</p> <p>RESOURCES Whiteboards</p>	<ul style="list-style-type: none"> Call out a decimal number with one place of decimals. Children have to round this number to the nearest whole number and show answers on whiteboards. Repeat with other decimal numbers. Ask: <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q What happens when the decimal is half way between two whole numbers?</p> </div> <p>Establish that decimals at the half way point and above are rounded up.</p> Call out a variety of decimals that involve units of measure or money. Children to round these to the nearest unit e.g. 6.7 m, 1.5 m, 4.1 m to the nearest metre and £4.27, £12.60, £14.05, £6.50 to the nearest £. 	<p>Find the difference between two decimal fractions with the same number of decimal places.</p> <p>VOCABULARY subtract take away minus difference between</p> <p>RESOURCES Resource sheet 10.1</p>	<ul style="list-style-type: none"> Write the following subtractions on the board: $32.7 - 21.2$; $£9.42 - £6.30$; $72.5 \text{ km} - 4.6 \text{ km}$; $43.5 \text{ m} - 21.7 \text{ m}$; $£12.52 - £8.78$. <p>Ask children to discuss in pairs how they would do these calculations. Discuss responses and agree which are easiest and could be done mentally or with the aid of jottings and which are too hard for this.</p> <ul style="list-style-type: none"> Remind children of the methods they have been taught to subtract whole numbers. Tell them that this method can also be used for decimal numbers. Demonstrate the method for a subtraction involving money e.g. $£15.63 - £7.86$. Remind children how they might use an empty number line. <div style="text-align: center;"> </div> <ul style="list-style-type: none"> Emphasise that this time the steps are not to hundreds and thousands but to first decimal places and whole numbers. <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q How can we set this out using a column method?</p> </div> <p>Give pairs of children time to present their method. Collect some examples and invite children to demonstrate them on the board. Remind children that they must line up the decimal points. Look for and discuss any compacted solutions such as:</p> $ \begin{array}{r} 15.63 \\ - 7.86 \\ \hline 0.14 \quad \text{to make } 8.00 \\ 7.63 \quad \text{to make } 15.63 \\ \hline 7.77 \quad \text{Answer is } £7.77 \end{array} $ <p>Remind children that the £ sign is only added to the answer, otherwise the calculation just involves the numbers.</p> <ul style="list-style-type: none"> Work through another subtraction question involving units of measure e.g. $63.84 \text{ kg} - 14.65 \text{ kg}$. Ask children to prompt you at each stage. <div style="text-align: center;"> </div> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q Can we reduce the number of steps when we set it out in column form?</p> </div>	<ul style="list-style-type: none"> Collect children's answers and correct any mistakes and misunderstandings. On the board write: A: 12.73, 6.24, 19.01, 10.92, 8.16 B: 15.58, 9.38, 2.86, 5.67, 8.07 <p>Say that the calculation is $A - B$.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q What numbers would you choose for A and B to get the biggest answer?</p> </div> <p>Collect and discuss suggestions.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q What numbers would you choose to get $A - B$ as close to 3 as possible?</p> </div> <p>Compare suggestions and identify the five possible calculations. Divide the class into five groups of children and set each group one of the subtractions. Collect answers.</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p>Q Which of the five answers is the smallest?</p> </div> <p>Establish which it is and why.</p> <p>HOMEWORK – Give out Resource sheet 10.1 with the two problems. Discuss the problems briefly and ask children to complete them for homework.</p>					

Planning sheet	Day Four (page 2 of 2)	Unit 10 <i>Addition and subtraction 2</i>	Term: <i>Spring</i>	Year Group: 5
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
			<p>Discuss how to compact the first two steps and the middle two steps and work through the column method.</p> $ \begin{array}{r} 63.84 \\ - 14.65 \\ \hline 0.35 \quad \text{to make } 15.00 \\ 48.84 \quad \text{to make } 63.84 \\ \hline 49.19 \quad \text{Answer is } 49.19 \text{ kg} \end{array} $ <ul style="list-style-type: none"> Emphasise that when setting out the sum this way the decimal points must line up. Tell children that they should use the number line alongside and the column method if it helps. Set the class some subtractions to do that involve decimal fractions. They should decide whether they can do them in their heads or use one of the above methods. 	<p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Find the difference between two decimal fractions with up to three digits and the same number of decimal places; Know that the decimal points should line up under each other. <p>(Refer to supplement of examples, section 6, page 51.)</p>

Planning sheet		Day Five		Unit 10 <i>Addition and subtraction 2</i>		Term: <i>Spring</i>		Year Group: 5	
Oral and Mental			Main Teaching				Plenary		
Objectives and Vocabulary		Teaching Activities		Objectives and Vocabulary		Teaching Activities		Teaching Activities/Focus Questions	
<p>Use of all four operations to solve word problems involving numbers and quantities.</p>		<ul style="list-style-type: none"> Ask the children to imagine a double decker bus which has 32 seats upstairs and 26 downstairs. Record the numbers 32 and 26 on the board. Ask children to identify the calculation needed to answer a series of questions such as: 		<p>Use all four operations to solve simple word problems.</p>		<ul style="list-style-type: none"> Discuss the two problems set for homework. Ensure that the children identified the correct operations and could answer them correctly. Compare and discuss the different methods the children used and correct any errors and misunderstandings. Use question 1 from the homework to show children how to set out the work for the day's problems. 		<ul style="list-style-type: none"> Share the answers to the problems with the children. Identify which problem the children found difficult and why. For these problems change the numbers to single-digit numbers. 	
<p>VOCABULARY total altogether difference sum</p>		<p>Children to show the calculation on their whiteboards.</p>		<p>VOCABULARY total sum difference altogether operation</p>		<p>Calculation: 3.85 – 2.58</p> $ \begin{array}{r} 3.85 \\ - 2.58 \\ \hline 0.02 \quad \text{to make } 2.60 \\ 0.40 \quad \text{to make } 3.00 \\ \hline 0.85 \quad \text{to make } 3.85 \\ \hline 1.27 \quad \text{Answer is } 1.27 \text{ m} \end{array} $		<p>Discuss this as a strategy to help them identify the calculation.</p>	
<p>RESOURCES Whiteboards</p>		<ul style="list-style-type: none"> At each stage discuss the calculations and the children's choice of operation. 		<p>RESOURCES Resource sheet 10.2</p>		<ul style="list-style-type: none"> Tell the children that today they are going to continue to solve problems which will require them to apply the methods they have been learning. Give out Resource sheet 10.2. Briefly discuss the problems on the Resource sheet and set children to work solving the problems. After two problems, stop the class and ask children to share their solutions with a partner. Briefly discuss the solutions and correct any misunderstandings before the children continue with the work. 		<p>Q How does changing the numbers to single-digit numbers help you solve the problem?</p> <p>Ask children to apply this strategy to question 10, making the desks 1 m and the wall 3 m.</p> <p>Q What calculations would you do to answer this problem?</p> <p>Change the numbers and the context of the problem, e.g. a car is 1.76 m wide. A parking space is 6.24 m wide. How much space is left when three cars park in it?</p> <p>Q Would we tackle this problem in a similar way?</p> <p>Establish that the problem will still be answered using addition and subtraction calculations.</p>	
						<p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Solve 'story' problems about numbers in real life, choosing the appropriate operation and method of calculation; Explain and record using numbers, signs and symbols how the problem was solved. <p>(Refer to supplement of examples, section 6, pages 82 to 89.)</p>			

1. A room is 2.58 m long. Aneel wants to put a carpet on the floor. The carpet is 3.85m long. How much spare carpet will he have?
2. Mary has £16.54 to spend on a present. She wants to buy a CD costing £14.79 and a card costing £1.99. How much more money will she need?

1. A bus seats 52 people. If 17 people get off a full bus how many remain on the bus?
2. I have read 134 pages of a book containing 512 pages. How many more pages will I have to read to finish the book?
3. In my money box I have £9.65. I earn £5.75 for doing jobs around the house. How much money do I now have?
4. A container of milk has 3.65 litres. If another 4.84 litres is added, how much milk is in the container now?
5. My brother was 48 cm long when he was born. He is now 1.27 m tall. How much has he grown since birth?
6. A water butt contains 7.95 litres of water. In a heavy downpour, 28 ml of rain fell. How much water is there in the water butt now?
7. For my birthday I received £47.50 from friends and relations. I spent £14.75 on a T-shirt and £11.85 on a CD. How much money do I have left?
8. At the supermarket, the shopping bill comes to £37.63. If I pay with a £50 note how much change should I get?
9. At birth Alice weighed 3.84 kg, Alan weighed 4.18 kg. How much lighter was Alice?
10. A desk is 0.87 m long. A wall is 3.84 m long. How much wall is left free after two desks are placed against it?

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19	26	63