

Planning sheet	Day One	Unit 5 <i>Problem solving</i>	Term: <i>Spring</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>Add or subtract a pair of two-digit numbers (crossing the tens but not the hundreds barrier).</p> <p>VOCABULARY sum difference</p> <p>RESOURCES Whiteboards</p>	<ul style="list-style-type: none"> Write a two-digit number on the board. Ask children to use their whiteboards to show the number which must be added to make 100. <div data-bbox="349 400 741 469" style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Q What do you notice about the sum of the units digits? </div> Write a number such as 56 on the board. Ask children to use their whiteboards to find pairs of two-digit numbers which sum to 56. Record different answers around the number, (e.g. 24 + 32). Repeat, asking for pairs of two-digit numbers whose difference is 56, e.g. 84 – 28. Write a number between 40 and 60 on the board, e.g. 53. Give another two-digit number, e.g. 27, and ask children to say what number was added to or subtracted from the first number to make the second (e.g. ‘subtract 26’). Repeat, inviting children to set the question. 	<p>Choose and use appropriate ways of calculating (mental, mental with jottings, pencil and paper).</p> <p>Check with an equivalent calculation.</p> <p>VOCABULARY method equivalent</p>	<ul style="list-style-type: none"> Write a calculation on the board, e.g. 74 + 58. Ask children to work out the answer using their whiteboards if they need to. <div data-bbox="1144 352 1798 397" style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Q How did you work it out? </div> <p>Record the methods used such as:</p> $74 + 60 = 134$ $134 - 2 = 132$ <div data-bbox="1144 523 1798 619" style="text-align: center;"> </div> <div data-bbox="1144 639 1798 684" style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Q What did you write down and what did you do in your head? </div> <p>Discuss the strategies and establish what was necessary to write down and why.</p> Repeat with a calculation which might need a pencil and paper method, e.g. 625 + 148. Record methods and discuss strategies. <div data-bbox="1144 839 1798 884" style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Q Why did you choose that way of calculating? </div> Provide further examples using other operations and discuss methods used. Emphasise that children should: <ul style="list-style-type: none"> Look carefully at the numbers involved when deciding which way to calculate. Ask themselves if they can do it in their head. Consolidate with examples for children to tackle independently. Collect answers and identify methods that are inappropriate encouraging the use of more efficient ways of calculating. Choose one question. <div data-bbox="1144 1206 1798 1251" style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Q How could you check your answer using another calculation? </div> <p>Collect and discuss equivalent calculations. Emphasise the importance of checking using an equivalent calculation.</p> 	<ul style="list-style-type: none"> Ask children to identify which calculations they did mentally. Discuss the strategies used. Emphasise it is all right to use jottings to support mental calculations. <div data-bbox="1861 464 2184 576" style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Q Which calculations did you find difficult to do mentally? Q Why were they more difficult than the others? </div> <div data-bbox="1861 592 2184 679" style="border: 1px solid black; padding: 5px; margin: 5px 0;"> Q Which strategies that I know will help me to answer these questions? </div> <p>139 + 8 = 139 + 11 = 148 + 5 =</p> <p>Ask children to explain and model examples of their calculations.</p> Repeat with other examples drawing on any that have been observed during the lesson. Emphasise that the children should always ask: ‘Can I do this in my head?’ <div data-bbox="1827 1031 2184 1369" 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"> Decide whether calculations can be done mentally or with pencil and paper; Explain and record how a calculation was performed; Use an equivalent calculation to check a result. <p>(Refer to supplement of examples, section 6, pages 72 and 74.)</p> </div>

Planning sheet	Day Two	Unit 5 <i>Problem solving</i>	Term: <i>Spring</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>Choose and use appropriate number operations.</p> <p>RESOURCES Whiteboards</p>	<ul style="list-style-type: none"> On the board write a number statement with the operation symbol omitted, e.g. $35 \square 65 = 100$. Children use their whiteboards to find and display the completed statement. Repeat, ensuring each operation and the omission of the = sign is included. Identify any misunderstandings, correct these and discuss the children's strategies. Develop by giving statements with two operations omitted, e.g. $27 \square 2 \square 4 = 50$. 	<p>Choose and use appropriate number operations to solve problems.</p> <p>RESOURCES Resource sheet 5.1</p>	<ul style="list-style-type: none"> On the board write a number statement and give a 'silly' number problem to go with it, e.g. $342 - 52 = 290$. '342 snails started the fun run, 52 were caught wearing roller skates and disqualified. How many snails completed the race?' Write a number statement for each of the four operations. In pairs, children make up 'silly' problems to go with them. Select volunteers to give examples. Record them on the board. <p>Q What words provide a clue about the operation involved?</p> <p>Underline the key words and discuss other examples that included these key words to see if the same operation was involved. <ul style="list-style-type: none"> Provide a 'sensible' problem, e.g. 'A box holds 60 chocolates. How many are left when 18 are eaten?' <p>Discuss which operation is needed and which words provide clues. Repeat with a problem involving division, e.g. 'A box holds 60 chocolates. How many people can have 6 chocolates each?' Give out Resource sheet 5.1. Ask children to identify the operations needed to solve each problem. <p>Q Did any problems require more than one operation?</p> <p>Discuss the children's choice of operations.</p> <p>Q Could some problems be solved in more than one way?</p> <p>For Questions 6 and 7 ask which operation can be used?</p> <p>Q Which words or phrases indicated addition?</p> <p>List the vocabulary under the heading 'addition' on the board. Repeat for the other operations.</p> <p>Work through the two problems showing children how to present their work. <ul style="list-style-type: none"> Ask children to solve each of the problems on the sheet with a partner. Interact with children discussing methods chosen. Collect answers and correct any misunderstandings. </p></p></p>	<ul style="list-style-type: none"> Q Which operations result in an answer which is larger than the numbers in the problem? <p>Discuss the effect of division and subtraction. <ul style="list-style-type: none"> Discuss and model the children's solutions to Questions 9 and 10. Provide another two-step problem and ask children to identify the operations involved, e.g. 'Simon bought a packet of football stickers for 55p and a chocolate bar for 18p. How much change did he get from £1?' <p>Q Which operations are needed for this problem?</p> <p>Ask children to give the equations. Record them on the board and with the class work out the answer.</p> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Choose the appropriate operations to solve word problems; Make up 'number stories' to reflect equations; Recognise the operation represented by a symbol in an equation. <p>(Refer to supplement of examples, section 6, page 74.)</p> </p>

Planning sheet	Day Three	Unit 5 <i>Problem solving</i>	Term: <i>Spring</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>Know by heart: multiplication facts for 2, 3, 4, 5 and 10 times tables. Derive quickly division facts corresponding to 2, 3, 4, 5 and 10 times tables.</p> <p>RESOURCES Whiteboards</p>	<ul style="list-style-type: none"> Ask the class to count in 2s to 20, 3s to 30, 4s to 40, 5s to 50 and 10s to 100. Extend: Count in 2s from 50 → 100 in 3s from 30 → 69 etc. Ask random quick-fire multiplication questions. Children show their answers using whiteboards. On the board write: $6 \times 5 = 30$ <div data-bbox="353 616 743 683" style="border: 1px solid black; padding: 5px;"> <p>Q What two division facts can we derive from this?</p> </div> <p>Children to show $30 \div 5 = 6$ $30 \div 6 = 5$</p> <ul style="list-style-type: none"> Repeat using other multiplication statements from which children derive division facts. 	<p>Choose and use appropriate number operations and appropriate ways of calculating (mental, mental with jottings, pencil and paper) to solve problems.</p> <p>Explain methods and reasoning about numbers orally and in writing.</p> <p>VOCABULARY operation</p> <p>RESOURCES Resource sheet 5.2 Resource sheet 5.3 Scales Items for weighing, e.g. potatoes and carrots</p>	<ul style="list-style-type: none"> Remind the class how they used key words in problems to decide which operation they needed to answer the question. Provide a problem such as: ‘A sack of potatoes weighs 23kg. A cook orders 8 sacks. What is the total weight of the potatoes?’ Ask children to discuss in pairs which operation is needed and an appropriate way to work out the calculation. Draw together and identify the key words in the problem. Establish that the problem involves multiplication and discuss different ways of calculating: mental: e.g. doubling 3 times mental with jottings: e.g. multiplying by 10 then subtracting 2 sacks written method: e.g. partitioning and using a grid Repeat using a problem that involves division, e.g. ‘A cook has 400g of cheese for making pizzas. Each pizza uses 50g of cheese, how many pizzas can the cook make?’ Split the class into two groups. For the group working on Resource sheet 5.2 in pairs children select one potato and one carrot and find their weight to the nearest 10g then solve a set of related problems. For the group working on Resource sheet 5.3 in pairs children solve the first eight word problems in the context of mass. Children should record their calculations so that the methods used are clear. At a suitable point change the groups over so that the children undertake both the activities. 	<ul style="list-style-type: none"> Discuss the activities, encouraging children to explain their methods and reasoning, using questions such as: <div data-bbox="1861 400 2184 588" style="border: 1px solid black; padding: 5px;"> <p>Q How did you work out the weight of 15 potatoes? Q Did anyone do it a different way? Q How did you work out the weight of 5 carrots and 5 potatoes?</p> </div> <p>Model a selection of answers. HOMEWORK – Ask children to complete Questions 9 and 10 on Resource sheet 5.3.</p> <div data-bbox="1832 775 2184 1161" 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"> Choose and use the appropriate operations to solve word problems; Decide whether calculations within problems can be done mentally or with pencil and paper; Explain and record how the problem was solved. <p>(Refer to supplement of examples, section 6, page 74.)</p> </div>

Planning sheet	Day Four	Unit 5 <i>Problem solving</i>	Term: <i>Spring</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>Derive doubles of all whole numbers to 50, doubles of multiples of 10 to 500 and the corresponding halves.</p> <p>RESOURCES Dice</p>	<ul style="list-style-type: none"> With whole class start with 5 and repeatedly double to at least 640. Clap a rhythm to set the pace. Work through each chain twice, quickening or slowing pace as necessary. Repeat from other starting points. Repeat using halving from multiples of 10 and 100. In pairs, children take turns to roll a dice. An odd number means 'double', an even number means 'halve'. Each player starts with a score of 80 and halves or doubles it depending on the dice. On their next turn they halve or double their new score. After five turns each, the player with the larger score wins. <div data-bbox="353 691 745 802" style="border: 1px solid black; padding: 5px;"> <p>Q What is the maximum score possible? Q What is the minimum score possible?</p> </div> <p>Ask children to explain how the maximum and minimum scores were calculated.</p>	<p>Choose and use appropriate number operations and appropriate ways of calculating (mental, mental with jottings, pencil and paper) to solve problems.</p> <p>Explain methods and reasoning about numbers orally and in writing.</p> <p>RESOURCES Resource sheet 5.4</p>	<ul style="list-style-type: none"> Discuss the two homework questions. Correct any errors and identify the strategies the children used. Present the class with the information shown on Resource sheet 5.4. Explain that the children are responsible for organising the food for a party with a given number of people. They need to make decisions about which food to buy within a given budget. Look at Resource sheet 5.4 together and ask preliminary questions to develop their thinking and reasoning, e.g.: <ul style="list-style-type: none"> How much does a pack of six sausage rolls cost? How many packs are needed for ten people? How much would it cost? How much would six packs of flavoured crisps cost? How many colas can you buy with £1? How will you ensure that there is a good selection of food with enough for everyone? Give small groups of children different budgets and different party contexts and sizes. Children should record their work clearly, showing the number of items needed, the total cost and include any written workings they have used. Each group is to present a menu and budget for display. Challenge children to spend a total as close to the budget as possible, but remind them they cannot exceed it. 	<ul style="list-style-type: none"> Discuss each group's menus and budgets. <div data-bbox="1865 355 2179 427" style="border: 1px solid black; padding: 5px;"> <p>Q Were there some items you could not afford?</p> </div> <div data-bbox="1865 443 2179 531" style="border: 1px solid black; padding: 5px;"> <p>Q How did you decide how much food to provide for each person?</p> </div> Ask for examples of calculations that were performed mentally, involved jottings, or a pencil and paper method. <div data-bbox="1832 699 2179 1010" 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"> Choose the operations and calculation methods that are appropriate for solving a problem; Explain and record how the problem was solved. <p>(Refer to supplement of examples, section 6, page 74.)</p> </div>

Planning sheet	Day Five	Unit 5 <i>Problem solving</i>	Term: <i>Spring</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>Recognise multiples of 2, 3, 4, 5 and 10 up to the tenth multiple.</p> <p>VOCABULARY multiple</p> <p>RESOURCES Whiteboards</p>	<ul style="list-style-type: none"> Ask the class to count in 3s to 30. On the board write the numbers: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30. Say that these are all multiples of 3. <div data-bbox="353 427 743 491" style="border: 1px solid black; padding: 2px;"> <p>Q Are any of these numbers also multiples of 2, of 4, of 5, of 10?</p> </div> <p>Children write those numbers that are also multiples of 2 etc. on their whiteboards.</p> <p>Repeat using 4s to 40. Write 50 on the board.</p> <div data-bbox="353 678 743 726" style="border: 1px solid black; padding: 2px;"> <p>Q 50 is a multiple of?</p> </div> <p>Collect the children's responses; repeat using another number.</p>	<p>Choose and use appropriate number operations and appropriate ways of calculating (mental, mental with jottings, pencil and paper) to solve problems.</p> <p>Explain methods and reasoning about numbers orally and in writing.</p> <p>VOCABULARY operation digit</p> <p>RESOURCES Whiteboards</p>	<ul style="list-style-type: none"> Write digits 1, 2, 3, and 4 on the board and the operations +, −, ×, ÷. Explain that the children can form number statements using any of the four operations but they must use all four digits every time. <div data-bbox="1144 375 1800 422" style="border: 1px solid black; padding: 2px;"> <p>Q What numbers can you make?</p> </div> <p>Ask children to make three different statements and work out the calculations on their whiteboards. Collect responses and model how to record the statements using brackets.</p> <p>Work these out with the class. Explain that the calculations in brackets are always done first, e.g. $6 = (21 + 3) \div 4$</p> <ul style="list-style-type: none"> Ask children to work in pairs, trying to make all numbers from 1 to 10. Take feedback, highlighting the different statements. <div data-bbox="1144 673 1800 810" style="border: 1px solid black; padding: 2px;"> <p>Q Which operations result in larger numbers? Q Which operations result in smaller numbers? Q Which operations combined with which number leave a number unchanged? Q How could we make answers greater than 10?</p> </div> <p>Correct any errors and misconceptions.</p> <ul style="list-style-type: none"> Challenge children to: <ul style="list-style-type: none"> Find as many ways as possible to make 12. Make all possible numbers from 11 to 20. Make all multiples of 10 to 100. 	<div data-bbox="1861 292 2181 379" style="border: 1px solid black; padding: 2px;"> <p>Q Were there any numbers less than 20 that you could not make?</p> </div> <div data-bbox="1861 387 2181 459" style="border: 1px solid black; padding: 2px;"> <p>Q Did anyone make all the multiples of 10?</p> </div> <ul style="list-style-type: none"> Ask children to explain how they tackled the problem (e.g. whether they worked randomly, systematically, broke the problem into smaller parts, etc.). <div data-bbox="1832 678 2181 1013" 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"> Choose and use appropriate operations and strategies for solving open-ended problems; Explain and record how the problem was solved. <p>(Refer to supplement of examples, section 6, page 74.)</p> </div>

Word problems

<p>1</p> <p>A tracksuit top costs £12.75. Matching joggers cost £9.50.</p> <p><i>How much would the tracksuit cost altogether?</i></p>	<p>2</p> <p>What is the sum of: £1.18 £213 and 47p?</p>
<p>3</p> <p>Sunil buys a can of cola which contains 330ml. Emma buys a bottle of cola which contains 500ml.</p> <p><i>How much more cola is there in the bottle than the can?</i></p>	<p>4</p> <p>Daniel is 151cm tall. His friend's height is 138cm.</p> <p><i>What is the difference in their heights?</i></p>
<p>5</p> <p>It costs £3.50 for 1 child to go to the cinema.</p> <p><i>How much would it cost for 4 children?</i></p>	<p>6</p> <p>Cartons of juice are packed in sets of 3. I need 24 cartons of juice.</p> <p><i>How many sets do I need to buy?</i></p>
<p>7</p> <p>There are 32 children in a class. They are in groups of 4 for the relay race.</p> <p><i>How many groups are there?</i></p>	<p>8</p> <p>For the school concert chairs are laid out in rows of 10. There are 12 rows.</p> <p><i>How many chairs are there in the hall?</i></p>
<p>9</p> <p>A packet contains 5 chocolate bars. In a class of 33 children the teacher wants to give each child a chocolate bar.</p> <p><i>How many packets must the teacher buy? How many bars are left for the teacher?</i></p>	<p>10</p> <p>Lucy has £5. She buys a drink for 75p and a packet of crisps for 45p.</p> <p><i>How much money has she left?</i></p>

Weighing problems

Choose a potato and find its weight to the nearest 10g.

Use this information to answer the following questions:

- How much would 10 potatoes like yours weigh?
- How much would 15 potatoes like yours weigh?
- How much would 8 potatoes like yours weigh?

Now choose a carrot and find its weight to the nearest 10g.

Use this information to answer the following questions:

- How much would 10 carrots like yours weigh?
- How much would 20 carrots like yours weigh?
- How much would 5 potatoes and 5 carrots like yours weigh?

Tom likes potatoes and Sally likes carrots. Every day Tom eats 2 potatoes and Sally eats 3 carrots.

What weight of potatoes would Tom eat in a month (30 days)?

What weight of carrots would Sally eat in the same month?

Word problems (mass)

<p>1</p> <p>1 potato weighs 225g.</p> <p><i>How much do 8 potatoes weigh?</i></p>	<p>2</p> <p>To make scones you need:</p> <p>225g flour 75g sultanas 250g butter 2 eggs 125g sugar</p> <p><i>How much of each ingredient would you need if you wanted to make twice as many scones?</i></p>
<p>3</p> <p>On Thursday a chef cooks 35kg of carrots. On Friday he cooks double that amount.</p> <p><i>How many carrots did he cook on Friday?</i></p>	<p>4</p> <p>Apples are put in bags of 10.</p> <p><i>If a bag weighs 980g, how much does 1 apple weigh?</i></p>
<p>5</p> <p>A tin of beans weighs 500g. A box holds 20 tins.</p> <p><i>How heavy is the box?</i></p>	<p>6</p> <p>Sally buys 200g of sweets at the pick and mix. Simon buys 150g and Sam buys 225g.</p> <p><i>What is the total weight of the sweets they bought?</i></p>
<p>7</p> <p>A packet of cereal weighs 500g. Samira eats 45g for breakfast.</p> <p><i>How much is left in the packet?</i></p>	<p>8</p> <p>A chicken and mushroom pie weighs 900g. Leon cuts it into quarters.</p> <p><i>How much does 1 piece weigh?</i></p>
<p>9</p> <p>A jar of coffee weighs 200g. A cup of coffee uses a spoonful weighing 5g.</p> <p><i>If Tim drinks 2 cups of coffee every day, how many days will the jar last?</i></p>	<p>10</p> <p>Chocolate spread is in a 400g jar. There are 16 jars in a box.</p> <p><i>How much does the box weigh?</i></p>

Price Lists

Main food items	Number in a pack	Price per pack
Sausage rolls	12	£1.90
Small sausages	20	£1.49
Chicken nuggets	20	£2.99
Pizza slices	4	£1.85
Ham sandwiches	4	£2.55
Egg sandwiches	4	£1.95
Cheese and pineapple sticks	10	£1.29
Burgers	4	£2.70
Bread rolls	6	£0.52
Cherry tomatoes	20	£1.25

Sweet items	Number in a pack	Price per pack
Ice cream	4	£1.60
Jelly pots	5	£0.82
Chocolate cakes	6	£1.39
Assorted cakes	6	£0.99
Chocolate biscuits	10	£1.20
Jam biscuits	12	£0.58
Plain biscuits	20	£0.52
Decorated birthday cake with candles	1	£10.00

Drinks	Price per glass
Orange squash	5p
Cola	18p
Lemonade	12p
Cherryade	15p
Blackcurrant juice	14p

Nibbles	Number of packs	Price per pack
Cheese sticks	6	£1.48
Bacon snacks	6	£1.25
Plain crisps	6	£1.22
Flavoured crisps	6	£1.35

Special items	Price
10 party hats	£2.00
10 balloons	£0.99
4 game prizes	£5.00

Items for party bags	Number in a pack	Price per pack
Small toys	5	£2.50
Balloons	10	£0.99
Chocolate bars	5	£1.00
Lollipops	6	£0.90
Bubbles	1	£0.25